

INDEX TO VOL. II.

EDITORIALS.		PAGE	PRINCIPAL ARTICLES.		PAGE			PAGE
Abolition of Abnormal Telephone Rates, The	169		"Adsit" Company and War Orders, The	104		London Telephone and Telegraph Society. Mr. Herbert Samuel's Speech at the Opening Meeting	60	
Air Raid Warnings	126		"Ardentia Verba." By H. Bristow	145		London Telephone Service Notes. 22, 44, 60, 77, 113, 125, 155, 167, 179, 203, 218, 229		
Bacillus of Sloth, The	79		Australian and Canadian Government Telephone Systems, The. By W. H. Gunston	8				
Channel Tunnel, The	227		"B.A." at Manchester, The	4		Military Training in Morse Working. By Geo. W. J. Praat	1	
Dublin	184		Battle of the Bawbees at Dundee, The	149		Morse (S. F. B.) and the Telegraph	17	
Dundee Cake	102		Birmingham, The Dawn of Telephony in	23, 48, 69		Morse's Beliefs	101	
Editorial Criticism	14		"Blätter für Post und Telegraphie (April 1915—April 1916). By W. H. Gunston... ..	209				
German Postal Budget, The	199		Bluff Télégraphique Allemand, Un—20,000 Mots à l'heure	222		New Headquarters for the Post Office London Engineering District	210	
Glorified Post Office, A	226		Booking of Trunk Demands by "A" Telephonists at the Central Exchange, Edinburgh. By R. G. D.	181		New Hope for Telegraphists, A	36	
Increase of Telephone Tariff Rates	13		Books for Our Soldiers and Sailors. By H. Monks	9		New Postal and Telegraph Charges, The	11	
Industrial Relations	56		"Broken in our Wars." By E. C. G.	43		New Postmaster-General, The	115	
Intrusive Comma, The... ..	185					Newport Automatic Exchange. By B. Waite	45	
Mixture as Before	127		Correlation of Public Administration and Finance, The. By F. C. Cook	171		New Wage Scale for Telephone Operators	193	
New Statutory Telephone Regulations, The	35		Course of Instruction in Field Telegraphy and Telephony. By R. Baxter	100		New York Telephone Society	215	
New Underground Telephone Cable between London and Liverpool, The	148					Notes from a Telegraph Officer's Diary 1868-1873. By W. H. Gunston	32	
Our Readers in the Field	103		Dawn of Telephony in Birmingham, The. A few early Reminiscences. By A. E. Cotterell... ..	23, 48, 69				
Protection of Telephonists, The	34		Deficit on the Telegraphs, The. By W. F. H. Webb	108		Phantom Circuits. By John Gaiter	19	
Postmaster-General on the Post Office Estimates, The	212		"Express"	89		Phantom Trunk, The. By E. J. Sithens	141	
Postmaster-General's Report, The	168					Phonograms. By B. R. Mead	110	
Ratio between Work and Wages, The Residuum of Effort, The	198		Few Glimpses of Postal Work, A	19, 54		Phonograms and Telephone-Telegrams. By J. R. Batchelor	137	
	56		Field Telegraphy and Telephony, Course of Instruction in	100		Post Office Estimates, The. The Postmaster-General's Statement	205	
Silver Lining, The	126		Functions of a Supervising Officer, The	7		Post-War Policy in Relation to Labour and Time-Saving Devices. By H. C. Gunton, M.I.E.E.	129	
"Some" Advertising	102					Postal and Telegraph Rates (Statutory Limits Bill). Debate in the House of Commons	39	
State Ownership of Telegraphs and Telephones, The	78		German Army and its Telephones, The German Postal Budget for 1916, The Government Ownership	147		Postal Work, A few Glimpses of	19, 54	
			Greeting from the Postmaster-General, A	1		Printing Telegraphy.—High Speed and Low Speed.—Metal Storage Transmitters. By Donald Murray, M.A.	91	
Telegraph Charges	34					Protection of Telephone Operators in New York, The	33	
Telegraph Tariff, The	12		Heroism of the Girl Telephonists	68		Profitable Evening, A. By J. J. T.	181	
Telegraph Tariffs	184					Provincial Organisation and Development. By R. A. Dalzell	61	
Telephone and the Cinematograph, The Telephone in the Near East, The	148		Importance to the Female Staff of being Earnest, The. By A. Grosch	64				
Telephone Surcharge, The	12					Recent Storms, The	104	
Telephone Trouble	170		Loading of Telephone Circuits, The. By A. B. Hart	150		Routing. By R. G. D.	220	
Telephonists and Zeppelins	14		London—Birmingham Telephone Cable. By P. E. Erikson	28				
Telephones for Telegrams	168					Section Supervisor and her Method of Working, The	116	
War and Telephone Expansion, The	78					Sinn Fein Rising, The	177	
Zeppelin Raid Warnings	149					Some Effects of the Telephone Transfer with some Thoughts as to the Future. By A. E. Cotterell	3	
						Some Notes on Wireless Telegraphy and the War. By B. S. T. Wallace	50	
						Some Trials of the Phonogram Supervisor. By Edith M. Matthews	58	

INDEX TO VOL. II.

iii

	PAGE
Spirit of Organisation, The. By V. ...	53
Supervision as seen from Below. By S. A. Coase	107
Technique Télégraphique en France depuis l'Origine, La. By J. J. T. ...	193, 207
Telegraphic Memorabilia. By J. J. T. 16, 37, 52, 80, 105, 121, 146, 163, 178, 196, 214, 228	228
Telegraph Legislation in the United States	225
Telegraph Tariffs	179
Telegraph Tariffs and Economic Needs. By John Lee	186
Telegraph and Telephone Work in a Provincial Depot. By J. M. Rusk ...	200, 216
Telegraphs and Telephones in Belgium under German Administration. By W. H. Gunston	195
Telegraphs in India. By J. J. Tyrrell...	81
Telephone at the Front, The. (From <i>Punch</i>)	54
Telephone Records:	
I. The First Introduction of the Telephone to the British Post Office	160
II. The First Official Account of a Telephone Exchange	191
Telephone Societies, The. By Arthur E. Cottrell	219
Telephones for Telegrams. The other Aspect of the Case. By F. B. G. ...	159
Telephone Operators and an Air Raid. By C. W. M.	162
Terrestrial Magnetism. By A. E. Cottrell... ..	143
Traffic Department in the Near East, A. By Florence J. Minter	72, 97, 117
Training of Male Night Telephonists, The. By Jas. Magnall	124
Training of Student Telephonists. By Maggie Puttick	122
Transformed Post Office, A. By R. Baxter	221
Transmission of Telegrams by Telephone, The. By H. J. E. Still	71
Thirty Years Ago. The Story of the Sixpenny Tariff. By John Lee ...	5
Unveiling of the Supplementary Roll of Honour at the Central Telegraph Office	197
War—The Telephone and the Tele- phonists. By Ada E. Carpenter ...	154
Watches of the Night, The. By a Special Constable.	15
Wireless Telegraphy and the War, Some Notes on	50
With the Expeditionary Force (VIII). By Lieut. A. A. Jayne, R.E. ...	26
Work of the Women of the London Telephone Service in War Time. By A. A. Heap	51
Written Complaints	90
Hic et Ubique.	
An Orthographic Puzzle.—Breastplates and Mouthpieces	14
The London Service.—Wireless Tele- phony.—Promiscuous Gift-making ...	36
Elektron.—Lord Farrer on the Telephone Service.—Post Office Promptitude,— Billy Sunday on Telephones ...	57
Chicago's Telephones.—Mr. Casson's Figures.—The Journal at the Front.— Greetings from Sheffield	77

	PAGE
Lieut.-Col. J. C. Chambers.—Mr. Burleson's Report.—Ministers and the Telephone.—Teutonic Alleviation.—A Public Scandal	103
Signallers.—Operators and Air Raids.—A Tall Story	128
A Debater's Handbook.—Guernsey Telephones.—Montreal to Vancouver.—"Horse Warmings,"	149
Mr. Walkley as Chairman of L.T. & T.S.—The New Traffic Section.—Morse Controversy.—War Taxation in Germany.—Mr. Berlyn's Postmaster-ship	170
Mr. Lee's Paper.—Portsmouth Auto- matic Exchange.—French Telephone Improvements.—An Emergency Tele- graph Code.—A Complaint of 1896 ...	186
Banking Reform.—Mr. Casson's Figures Again.—Preparedness	199
Antwerp Exchange.—A Lengthy Tele- gram.—The Blue Strip.—The Ameri- can Government's "Take-over."— The Bear and the Coyote	213
Our Second Volume.—Channel Tunnel. —Spelling Reform.—Chicago "Pre- paredness."—A Side Line	227
Miscellaneous Paragraphs.	
Belfast G.P.O. Honour Roll	231
Bristol Telephonists and Colleagues on Active Service	96
Criticisms of the New Charges	11
Death of a Pioneer of Submarine Telegraphy	116
Dover, Extract from Report of Air Raid at	157
Economy. (From <i>Punch</i>)	33
Edinburgh Telegraphists' Roll of Honour "Everyman," Performance of, by Members of C.T.O. Staff	140 164
Fowls and Fouls	183
Girl Probationers, Distribution of Prizes to	225
Gloucester Entertainment for Soldiers' Wives and Children	158
Hughes Keyboard employed in Russia	113
Leeds Concert, A	55
Leeds Operetta in aid of Post Office War Relief Fund	165
Letters from the Front. Mr. Stretton (L.T.S.)	21
Leytonstone Concert in Aid of Wounded Soldiers	150
London Concert in Aid of War Charities	50
Mallock-Armstrong Ear Defender, The Military Machine, The	165 74

	PAGE
New Cross,—Entertainment to Wounded Soldiers by Exchange Staff ...	167
New York Western Union ...	74
“Our Neighbours,” Birmingham ...	128
Paddington Exchange: Tea and Entertainment for Poor Children ...	158
Plymouth: Amalgamation of Trunk and Local Exchanges ...	37
Post Office Relief Fund... ..	48, 96, 158
Post Office Relief Fund (Belfast Committee) ...	80
Presentation to Mr. H. C. Townsend ...	88
Presentation to Mr. F. F. Lynch ...	183
Railroads to have Girl Operators ...	197
Recollections of Lord Alverstone ...	21
Red Cross Hospital at Malta ...	180
Siemen's Staff, Messrs.	140
Sheffield Social Outing	21
Soldiers Entertained by Kingston Telephone Exchange Staff ...	232
Staff and Technical Classes, The ...	18
Telegraph Finance	15
Telephone and Telegraph Societies:	
London	21, 79, 230
London Telephonists'	43
Brighton	112
Telephone Masonic Lodge	204
Telephone Service	147
Telephone Staff Hospital Collection ...	158
Telephones to all Parts	224
Trunk Fee Accounts. By V.	50

Personalia.

News of the Staff ... 22, 44, 65
88, 114, 136, 157, 176, 190, 204, 218, 231

Obituaries.

Mr. Joseph Thyne	...	...	...	114
Acting Quartermaster Fradd	...	...	...	114
Mr. C. J. Wollaston	...	...	...	116
Mr. C. J. Spears	...	...	...	136
Mr. P. Duxbury	...	...	...	204
Mr. P. G. Burrell	...	...	...	211
Mr. H. Bille	...	...	...	231

Retirements.

Mr. A. Perkins ...	...	...	...	125
Miss B. H. Nicholas ...	...	...	...	204
Mr. Edward Beaumont ...	...	...	...	231

Reviews.

Blätter für Post und Telegraphie	...	209
Elementary Lessons in Electricity and Magnetism. By Silvanus P. Thompson	...	165
Elementary Manual of Radiotelegraphy and Radiotelephony. By J. A. Fleming	...	203

	PAGE		PAGE		PAGE
Handbook of Technical Instruction for Wireless Telegraphists. By J. C. Hawkhead and H. M. Dowsett ...	75	"Red Riding Hood," Paddington. Group of the Caste ...	158	EDITORIAL CRITICISM—	
"Mental Efficiency" Series ...	122	Storm Damage in the Midlands ...	166	J. L. McGrath ...	18
Questions and Solutions in Telegraphy and Telephony Examinations. By H. P. Few ...	144	Supervisors of the Birmingham Exchanges. Portrait Group ...	66	R. Kirkwood ...	36
Sell's Telegraphic Addresses ...	144	Then and Now ...	213	EFFECT OF WEATHER ON EXCHANGE FAULTS—	
Technique Télégraphique depuis l'Origine, La ...	193, 207			D. D. Robinson ...	43
Telephone and Telephone Exchanges, The. By J. E. Kingsbury ...	75			FIELD TELEGRAPHY AND TELEPHONY—	
Venture, The ...	122			W. H. Thornburn ...	156
Wireless Telegraphy. By Dr. J. Zenneck Wireless Telegraphy and Telephony. By W. H. Eccles ...	181 165			INDUCED ELECTRIC CURRENTS—	
Wireless Telegraphists' Pocket Book, The. By J. A. Fleming ...	27			S. C. B. ...	135
Wireless Transmission of Photographs. By Marcus J. Martin ...	164			LABOUR AND TIME SAVING DEVICES—	
				Jno. H. Doherty ...	156, 183
				LONDON TELEPHONISTS' SOCIETY—	
				"H" ...	64
				PHONOGRAMS—	
				Edith M. Matthews ...	135
				M. B. Pyne ...	135
				J. A. W. Gregory ...	167
				RATIO OF WORK AND WAGES—	
				"Optimist" ...	218
				TELEGRAPH TARIFFS AND ECONOMIC NEEDS—	
				W. F. H. Webb ...	183
				M. F. W. ...	197
				R. G. Leathern ...	218
				TELEPHONE ENGINEERING ECONOMICS—	
				W. Watson ...	112
				TRAINING TELEPHONISTS—	
				S. J. Pharo ...	156
				TRANSMISSION OF TELEGRAMS BY TELEPHONE—	
				R. G. D. ...	64
				J. J. T. ...	74
				F. W. ...	135

Larger Illustrations.

Bristol Telegraphist's Home in France, A	224
Economy. (From <i>Punch</i>) ...	33
Edinburgh Roll of Honour ...	179
"Mystic Mirror" Leeds. Group of the Caste ...	176
New Postmaster-General, The ...	115
Postmaster-General, Assistant Post- master-General and Principal Officers of the Telegraph and Telephone Services ...	Supplement to January

Our Monthly Record of Naval and Military Honours.

27, 59, 96, 123, 153

Correspondence.

BIT OF HISTORY. A—	
E. C. G. ...	64
BOOKS ON POSTAL ADMINISTRATION—	
Quære ...	197

THE Telegraph and Telephone Journal.

No. 13.

The Telegraph and Telephone Journal.

*A Journal published under the Patronage of
the Postmaster-General in the interests of the
Telegraph and Telephone Services.*

Managing and Organising Committee:

JOHN LEE (Telephone: Official 593).

J. W. WISSENDEN (Telephone: Official 238).

Managing Editor:

W. H. GUNSTON (Telephone: Official 841).

Secretary's Office:

General Post Office, London,

1 October 1915.

The Editing Committee begs to remind you that your subscription to the first year of the Journal expired with the September number. If you desire to renew your subscription to September 1916 perhaps you will kindly remit 2/- to Mr. W.H. Gunston (for the Secretary's Office) or to Mr. I.H. Jenkins (for the Engineer-in-Chief's Office). A list will be sent round.

When peace comes, the Telephone Service, in common with the other economic activities of the nation, will again expand, probably with additional rapidity owing to the retardation now.

may perhaps in future be read by anyone within hearing distance of a sounder after the war, "chatterers," which occasionally are fixed outside silence cabinets to prevent overhearing, will be discovered on the back of sounder screens.

PAGE

...	12
...	12
...	13
...	14
...	14
...	14
...	15
...	16
...	17
...	18
...	19
...	19
...	22
...	22

*Copy to any Post, Telegraph, or
Orders should be sent to the*

et, London, E.C.

ments both of the telegraphs
ed and perfected. Individual
s, can seize the opportunity
s. Junior members of the
rection or another may be
well advised to describe it
rich I know would be gladly

the high standard it has
ublication, and I send it my
fulness in helping to maintain
velopment of a branch of
t value to the nation.

HERBERT SAMUEL.

MORSE WORKING.

perintendent, Bournemouth).

described as a "telephone
ependent for success upon a
service between the several
e heroic deeds of those who
lines and repairing broken
y once but on many occasions

r "flag wagging" has been
egraphing and telephoning
own generally as "buzzing."
graph operators has grown
ry 100 officers and men have
ie "dot and dash," or in the
To appease the anxiety of
ublic who fear their telegrams

THE Telegraph and Telephone Journal.

VOL. II.

OCTOBER, 1915.

No. 13.

CONTENTS.

	PAGE		PAGE
A GREETING FROM THE POSTMASTER-GENERAL	1	EDITORIALS.	
MILITARY TRAINING IN MORSE WORKING. BY GEO. W. J. PRAAT ...	1	THE TELEGRAPH TARIFF	12
SOME EFFECTS OF THE TELEPHONE TRANSFER, WITH SOME THOUGHTS		THE TELEPHONE SURCHARGE	12
AS TO THE FUTURE. BY A. E. COTTERELL	3	INCREASE OF TELEPHONE TARIFF RATES... ..	13
THE "B.A." AT MANCHESTER	4	TELEPHONISTS AND ZEPPELINS	14
THIRTY YEARS AGO. BY JOHN LEE	5	EDITORIAL CRITICISM	14
THE FUNCTIONS OF A SUPERVISING OFFICER	7	HIC ET UBIQUE	14
AUSTRALIAN AND CANADIAN GOVERNMENT TELEPHONE SYSTEMS. BY		THE WATCHES OF THE NIGHT. BY A SPECIAL CONSTABLE ...	15
W. H. GUNSTON	8	TELEGRAPHIC MEMORABILIA	16
BOOKS FOR OUR SOLDIERS AND SAILORS. BY H. MONKS	9	S. F. B. MORSE AND THE TELEGRAPH	17
THE NEW POSTAL AND TELEGRAPH CHARGES	11	CORRESPONDENCE	18
		PHANTOM CIRCUITS. BY JOHN GAITER	19
		A FEW GLIMPSSES OF POSTAL WORK. BY W. W. YOUNG ...	19
		LONDON TELEPHONE SERVICE NOTES	22
		PERSONALIA	22

Subscription : To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies : To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

A GREETING FROM THE POSTMASTER-GENERAL.

WHEN an industry is controlled by a Government Department or a municipal authority there is often a danger that the quality of initiative, the constant effort to effect improvement, which is the mark of successful private enterprise, may be weakened and even disappear. In the Post Office, thanks to the zeal of its officers and to constant contact with the public, this danger has to a large extent been avoided. The administration of the telegraphs and telephones is a business, highly technical, constantly developing, which demands for its successful conduct incessant watchfulness, a readiness to adopt new ideas, and an intimate knowledge of technique on the part of great numbers of Government officials. For their service this JOURNAL has been founded. For these purposes such a magazine is indeed indispensable. Men who in normal times are (or should be) very busy, must have collected for them the facts which they need. Scattered all over the country, they have not the opportunity, even if they had the leisure, to extract from books and periodicals the up-to-date information it is essential they should have.

The promoters of the JOURNAL were right not to be deterred from their enterprise even by the outbreak of war. The success of the paper during the first twelve months of its publication has justified them; it forecasts still greater success when normal conditions return.

For the time being, the rapid development of the Telephone Service, which was expected and planned for, must necessarily be in abeyance. Capital and labour have to be directed during the war to needs even more urgent. But this is only temporary. When peace comes, the Telephone Service, in common with the other economic activities of the nation, will again expand, probably with additional rapidity owing to the retardation now.

Meanwhile the working arrangements both of the telegraphs and of the telephones can be examined and perfected. Individual officers, working under less pressure, can seize the opportunity to improve their own qualifications. Junior members of the Service, whose experience in one direction or another may be of value to their colleagues, would be well advised to describe it in contributions to the JOURNAL, which I know would be gladly received by the Editor.

I congratulate the JOURNAL on the high standard it has maintained during its first year of publication, and I send it my best wishes for a long career of usefulness in helping to maintain the efficiency and promote the development of a branch of Government work which is of highest value to the nation.

HERBERT SAMUEL.

MILITARY TRAINING IN MORSE WORKING.

BY GEO. W. J. PRAAT (*Traffic Superintendent, Bournemouth*).

THIS war has not inaptly been described as a "telephone war." Every military operation is dependent for success upon a continuous telegraph and telephone service between the several points of strategical control, and the heroic deeds of those who maintained communication by laying lines and repairing broken wires under heavy fire have not merely once but on many occasions been recognised.

Signalling by means of flags, or "flag wagging" has been almost entirely superseded by telegraphing and telephoning messages. The former operation is known generally as "buzzing." Consequently, the number of telegraph operators has grown enormously. Probably 25 out of every 100 officers and men have been initiated into the mysteries of the "dot and dash," or in the military vernacular "iddy umty." To appease the anxiety of those prejudiced few members of the public who fear their telegrams may perhaps in future be read by anyone within hearing distance of a sounder after the war, "chatterers," which occasionally are fixed outside silence cabinets to prevent overhearing, will be discovered on the back of sounder screens.

It is true telegraphists are not made in a day, but they have a way in the Army of turning them out in a remarkably short space of time. A few words on the subject may not be inappropriate in the columns of this journal.

A class was formed recently of 24 men picked from a regiment of cavalry. The men were relieved of practically the whole of their ordinary duties, and were placed under the control of the instructor.

Nearly two hours a day were devoted to a lecture on the theory of telegraphy and telephony. Each man was supplied with a notebook, and he was encouraged to make use of it extensively both for notes and drawings. After the final lecture a written examination was held. Fourteen men secured 80 per cent. and over of the highest possible marks, which speaks well for the attention paid by the men to this side of the subject. *En passant* it is suggested that a course of lectures on elementary magnetism and electricity and their application to telegraphy and telephony might be beneficial to the staff and indirectly to the Department if it were included in the curriculum for telegraph learners in the Post Office.

Excluding intervals for meals there remained four hours a day for telegraph or Morse practice. An effort will be made to show that this time was well employed. The initial step was to teach the Morse alphabet. Three methods at once suggest themselves.

- (1) Commence at A, take a few letters at a time, and finish at Z.

- (2) Take groups of letters of similar formation such as,

E .
I ..
S ...
H

which differ only in the number of dots, and similarly with other groups, and

- (3) "Pairing-off" the letters. That is to say, taking a letter together with its opposite, and so committing them to memory in pairs. For example:

A . — and N — .
B — ... and V ... —

The first method is the least scientific, and where no better system has been explained is the one generally adopted by a learner. A stumbling-block is encountered at the third letter, because C is perhaps the most difficult letter for a learner to form correctly. The second method is probably the most favoured. Comparatively large groups of letters can be memorised easily. It is simple to remember. But the third method has much to commend it and certainly produces very smart results. It is perhaps more adaptable than the others. The letters of simple formation can be taken first and thus pave the way for more complicated symbols. In this system it is possible to embrace all but three letters of the alphabet. Excellent practice can be obtained by dealing out on a table small cards on which are printed Morse characters. Gradually increase the speed. It is surprising how quickly the code can be mastered in this manner.

There is one other method of committing the alphabet to memory. And, like analogy, it is one in which it is not advisable to lay down hard and fast rules on the subject, at any rate those applied in the Army. This system is based on the phonetic difference in the words "dot" and "dash." The evidence of emphasis in the latter is absent in the word "dot." The combination "Dash, dot, dash, dot," denoting the letter C, may be translated phonetically into "Get your hair cut." And similarly with each letter of the alphabet.

At the close of the second day every man was able to form correctly and from memory the letters of the alphabet. Of the 24 men in the class only three possessed previous knowledge of telegraphy, one having passed through the Army School of Signalling many years ago. Practice was now the order of the day.

In addition to the alphabet the rules for signalling punctuation and special signs, figures, whole numbers, fractions, and mixed groups, block letters and the letter clock or code time were taught. One or two were taken each day, but they occur in practice so

infrequently that these rules should be written in the notebook possessed by every well-equipped student.

The apparatus available comprised two portable telephones of the D Mark III pattern and three ordinary single current keys. After the third day it was practicable to divide the class into five sections to agree with the number of instruments in use, and every other day a slight re-distribution was effected with the object of grouping men of equal ability. All sections had equal use of the two kinds of instruments.

The progress made by the class as a whole can perhaps best be shown in the form of a summary.

Date.	Sending.			Receiving.		
	No. of men able to send in one minute			No. of men able to receive in one minute		
	Five words or less.	Between five and ten words.	Over ten words.	Five words or less.	Between five and ten words.	Over ten words.
After 6th day ...	6	15	3	20	3	1
" 10th " ...	—	15	9	9	13	2
" 14th " ...	—	1	23	7	15	2

After fourteen days all but one man could send over ten words a minute, and fifteen could read between five and ten words a minute. The average of two tests of two minutes each was recorded; time would not permit tests of a longer period. The man who after fourteen days was unable to send over ten words a minute frankly admitted that he "had proved a failure." A learner in the Post Office at this stage of his career would more likely be drawing a comparison between his own ability and the puny efforts of the superintendent at his office.

Four of the best results from men with no previous telegraph experience are worthy of special mention.

Send per minute	and	Read per minute.
15.2		8.3
15.3		8.0
15.0		7.5
16.0		6.6

To what is the rapid progress attributed? One man here and there might be found with special aptitude for learning telegraphy; on the whole the men possessed average intelligence. If one put the question to the officer commanding he would undoubtedly reply with outward evidence of satisfaction that "the men are frightfully keen," a fact that was obvious whenever the order to "dismiss" was given. The writer came to the conclusion that two factors were mainly responsible—viz., the type of instrument used and a judicious grouping.

The portable field telephone is used extensively in the Army for maintaining communication between the trenches and the base, and between the units of a brigade of artillery. The telegraph portion of the instrument, known as the "buzzer," comprises a battery of two "dry" cells, a key for signalling, a receiver for reproducing the signals, and an induction coil with interrupter for converting a direct current of low pressure into an alternating current of high pressure. There is an important difference between reading from a "buzzer" and reading from a sounder. Whereas in the former case a dot is distinguished from a dash—a dash is three times the length of a dot—by the duration of a buzzing sound, in the latter the distinction is made by the time interval between the click when the armature strikes the bottom stop and the click when the armature returns to its normal position on the top stop. In other words the elements are distinguished on a buzzer by an audible signal, and on a sounder by what may be described as a negative result. It is suggested that experiments should be conducted in the Post Office with the view to determine whether efficiency in telegraphy would be attained earlier if a learner were trained in "buzzer" working before practising on the sounder, rather than commencing his training with a sounder. There are good grounds for believing that a beginner experiences less difficulty in reading from a "buzzer" than from a sounder, and consequently he would become familiar with the characteristics of the Morse alphabet quicker.

No less important was the second point, the careful grouping of men according to their capabilities. Where days and not months are involved it is imperative that no man shall be kept back in the race for the top position. No more detrimental effect on a learner's progress is conceivable than keeping him or her practising with a less efficient learner. Each man was tested on alternate days and moved up or down according to the result. This system created and maintained an interest in the work throughout the course. And here again there is material for reflection in Post Offices where learners are employed.

SOME EFFECTS OF THE TELEPHONE TRANSFER, WITH SOME THOUGHTS AS TO THE FUTURE.

By A. E. COTTERELL.

THE passing of nearly four years since the day of the transfer of the telephones to the State is marked by a general settling down which admits of some contemplation of the things which were and the things that are. Perhaps the uppermost wonder is that, notwithstanding the many changes, inevitable and otherwise, general conditions are varied to so slight an extent. Meanwhile the great machine moves forward with increasing ease on broad lines not very dissimilar to those traversed in the past, thereby emphasising the belief that there may be diversities of administration but one law.

The fusion of a staff fostered by an alert independent company into the staff of a great Government Department could hardly be consummated without the arising of some conflicting views based on the different standpoints, but it is pleasing to reflect on how much friction has been avoided and the extent to which the wheels have been greased by the good will displayed on both sides now merged into one united camp.

That was a happy inspiration of the Postmaster-General (the Rt. Hon. Herbert Samuel) when he issued his manifesto of welcome to the transferred staff, whilst the appeal which he therein made to his existing staff to receive helpfully and cordially the newcomers fell on very fruitful ground—a fact which is worthy of recalling with gratitude by those affected.

Bound together as we now are in an united camp with barriers no longer visible, it may be useful to consider exactly where we stand and the extent to which old conditions have been maintained and improved upon in the interests of the public whom we serve.

NEW BUSINESS.

The National Telephone Company, quite properly with a commercial eye to dividends, was ever alert to do new business. The Post Office by retaining the Contract Departments has maintained that tradition, with this added advantage to the public that being primarily concerned with the necessity for meeting the needs of the community, it is able and willing in normal times to extend the system to places which the Company could not afford to serve, hampered as it was with closer financial limitations.

The Post Office therefore with larger resources and unhampered by insecurity of tenure, should be able to expend larger sums on underground and other equipments, whereby frequent limits of the capacity to connect subscribers should be avoided, as also the consequent delay.

No doubt these fuller advantages have hitherto been retarded to some extent since the transfer, owing partly to the enormous amount of back work which had to be got up in consequence of the late Company quite naturally avoiding where possible heavy capital costs towards the close of its career, whilst, on the other hand, amongst other causes the present war has unavoidably interfered with the good progress which would otherwise have been made owing to the urgent calls made in so many ways upon the Engineering staff.

Meanwhile, however, an enormous amount of work has been accomplished. New exchanges have been opened, increased

capacity has been provided in many of the larger towns, and the service extended, either by small exchanges or call offices, or by direct and rural party lines, to such scattered and thinly populated districts as were outside the company's dreams.

QUALITY OF NEW WORK.

It is no disparagement to the old Company to say that taken as a whole the Post Office aerial construction is superior. The Post Office has advantages which the Company did not possess in the matter of wayleaves, thereby being able in numerous cases to secure better routes, and is perhaps able to be more generous at times in the matter of timber.

This should ensure the public having, if anything, a somewhat more reliable service where aerial wires are involved, although the late Company gave on the whole a good service in this respect.

MAINTENANCE AND FAULTS.

The Post Office is no doubt able to be somewhat more generous than the Company in questions of renewal of plant, whereby the incidence of faults may to some further extent be anticipated. The Company, however, are to be credited with much effort in this direction.

The Department may also be able to give closer attention to some outlying faults by reason of a larger staff, but it is hardly likely, as a whole, that faults will receive more prompt attention than they did under the Company, whose general arrangements and attention in this respect deserved great praise.

SERVICE.

Here we find ourselves on a threshold which opens up vistas of great possibilities. The growth of the larger exchanges and the general ramifications of the system renders it daily more and more necessary that the various operations and practices should be standardised throughout the Service, and the most efficient and consistent principles laid down to meet the needs of special cases. The need for this was recognised by the late Company, and no inconsiderable steps were taken in that direction; and without doubt still greater measures would have been adopted but for the financial exigencies of the later years of its operations. The Post Office, with a full recognition of its responsibilities to the State, is able to approach this question with more freedom from those conditions which trammelled the Company, and a good illustration of its advance in this respect is to be seen in the institution of the numerous new traffic departments throughout the country, and the augmentation of the staff of existing ones.

Although the Company was not ungenerous in the provision of junction circuits, it is thought that the Post Office is able to approach the question with more singleness of purpose, which must result in advantage to the public.

Even in the matter of trunk lines it is thought that the unification of proprietorship of the trunk and local services must lead to a better perspective, which formerly was, perhaps, to some extent blurred by doubts as to the fulness of mutual co-operation, with the result that under present conditions a closer knowledge of the real requirements and a single-handed control should tend to greater efficiency in several respects.

A step in a very useful direction has been taken by encouraging the formation of Advisory Committees in various parts of the country. Very great good should arise as a result of these. On the one hand they afford a ready means of informing the Department of the public needs and the public points of view, whilst on the other hand the frank interchange of ideas between these committees and the Post Office cannot fail to assist the public in appreciating the efforts which are made to meet their convenience and requirements, and also to make clear the grounds on which it is sometimes impossible to afford some of those conditions which *prima facie* appear to be so simple and reasonable until some inner knowledge reveals their impracticability.

In speaking of the service regard should be given not only to its quality but to its facilities, and in this respect the transfer to the State has most decidedly broadened these conditions. The increased

user of local Post Offices as call offices is a great convenience to the public, and the joint user of numerous circuits for telegraphic and call office purposes has helped to spread a network in out-of-the-way localities where the moderate needs for the service would not otherwise justify the provision of such convenience.

RECONSTRUCTION.

It is well known that there have been many advances made in types of switchboard and other plant since the earlier years of telephony. The Company undertook a great deal of reconstruction work in order to keep pace with modern methods, but for the most part this was largely confined to the principal towns, or had some reference to those cases where new premises were necessary or when the existing plant was becoming exhausted either in regard to its capacity or to its period of general efficiency. Whilst the Post Office, similarly to the Company, would hardly be justified in scrapping plant still capable of affording a reasonably good service, it is thought that its obligation to the public interests justifies it in moving more rapidly than the Company did in the direction of modernising its general equipment, and the progress already made in this direction is a good indication of such a policy.

FUTURE OUTLOOK.

Those of us whose association with the Service dates back to the earlier days, are familiar with an oft-used expression that "the telephone is only in its infancy," and even now perhaps we only regard it as having attained a vigorous youth.

It is not proposed to enter now upon a forecast of the future possibilities as to which we are all imbued with ideas.

This brings me to a point where I am not at all sure that I shall receive a full measure of support, nevertheless I would venture on a personal opinion for what it is worth. The policy of the Company was to conduct a campaign of accretion to its roll of subscribers, and the Post Office continued the practice. For the Company such a course was proper to its *raison d'être*, which was primarily to make money. The Post Office, I take it, stands on a different foundation, its primary duty being to serve the community as required, with no desire to make large profits on its telephone service, but to afford such a service on a self-supporting basis with a modest margin only. One of the results of the Company's efforts in straining for new business was to find itself often in arrear in the matter of connecting up new subscribers, whereby considerable irritation to the public arose. The Post Office, with a heritage of large pressing works to be undertaken, and a large number of unexecuted orders, has been not a little handicapped, and its recent progress has been and will be considerably affected for some time to come by the call on the nation's manhood through the war, which has largely drawn on the rank and file of the Engineering staff.

The personal view of the writer is that the general pursuit of new subscribers might well be at the least slackened off even after the war, thereby enabling all back work to be overtaken, and that the Contract Departments should devote attention principally to such matters as the retention of old subscribers and, to some extent perhaps, obtaining others for the economical occupation of spare circuits where they may exist in very great numbers, or of long and outlying ones which may be thrown spare from time to time, and for the necessary work in connexion with new exchanges.

A less feverish haste to acquire new subscribers would enable any arrears of work to be overtaken and give breathing space for movements which would consolidate the service.

It is worth a thought whether the public would not be better served by a steadier progress, whereby the plant would always be well ahead of the public needs, ensuring promptitude in making new connexions, in carrying out removals and affording the highest efficiency in service.

No more reason is seen for trying to educate the public to a wider use of the telephone than for persuading them to buy more stamps, send more telegrams, or use more postal orders, unless it be the more or less academical one that the greater the number connected the greater the utility. No doubt the addition of some

subscriber may, to some extent, induce others to join, thereby providing an aid to canvassing, but the addition of those persons who are really wanted by existing subscribers has a knack of adjusting itself. In a general way those people who have intimate business or social interests usually join of their own volition or by mutual persuasion.

On the other hand the application of what, for want of a better term, may be called a "forced draught" in canvassing is apt to lead to the acquisition amongst others of numerous subscribers who have been over-persuaded and do not continue as such for various reasons, whereby some waste of plant ensues or expense is incurred in adapting their circuits for the use of others.

By now the public as a whole are well acquainted with the uses and conveniences of the telephone, and may probably be quite well left to make their own choice as to personal need or otherwise.

The criterion of a good telephone service is surely not governed by the ratio of telephone instruments per acre or per head of the population, but by its thorough efficiency and its absolutely ready availability to those who require it.

THE "B.A." AT MANCHESTER.

SAID a junior officer, "There's a new association been formed to compete with the 'P.A.,' and it's going to make a lot of work because they've warned us for overtime."

This year's meeting of the British Association has suffered from a collision of interests. The general public, whose acquaintance with the learned discussions of the body is usually made through the Press, had found that the reports, like the attendance at Manchester, have been smaller than usual, for the war and the importance attached to the Trades Union Congress have disputed the claim for attention.

There was for a moment the prospect of some excitement being aroused by the campaign against the president-elect, but fortunately the journalistic *bruit* did not deprive the gathering of Professor Arthur Schuster's really brilliant address.

The *Manchester Guardian*, in editorial comment, referred to it as one of the few presidential addresses delivered to the learned body that would be understood of the people; and it is all to the good that a discourse whose text was "The common aims of science and humanity," should be freed from the *clichés* of the scientist's vocabulary; for it is too frequently the misfortune of the expert that what was intended to be the vehicle of his exegesis becomes in his hands an obstacle confronting his readers or hearers.

The president did well to remind his hearers that among the achievements of the association must be placed the establishment of electric units, universally accepted throughout the world, which originated with one of its committees, and the justification for holding their conferences in manufacturing centres thereby uniting pure science with practical life needed neither defence nor apology.

That aesthetic pleasure plays an important part in the motives underlying scientific study is little appreciated, and the support of Karl Pearson and Poincaré, to whom the president appealed, may not help the layman to apprehend that aspect. One is reminded that some years ago a young playwright, starting from this point of view, managed successfully to convey his lesson despite the defeat of his scientist by the antagonism of both parties concerned with the commercial exploitation of the new energy. And the examples of Joule and Henry Wilde, who were cited as placing the idealistic purpose before all thought of material gain, might be paralleled by many others, but by none so completely as the venerable insects' Homer of Provence—Henri Fabre. If aesthetic pleasure be the recompense of scientific discovery, success in this field, like virtue, is its own reward.

The apparent conflict between theory and practice was well described as a most fatal distinction, and the Disraelian definition of the practical man, who "practised the errors of his forefathers," particularly apt, whilst scarcely less happy was the hit at the man of action who "is frequently one who cannot give any reasons for his action." Less clear, if equally fruitful, was his fastening

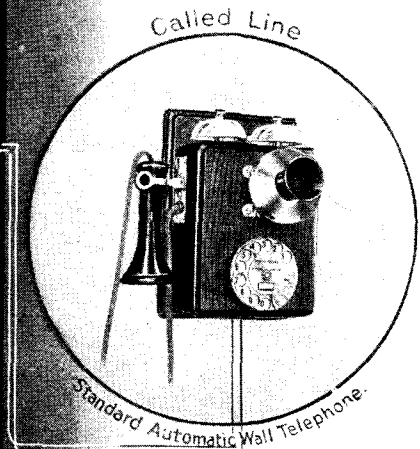
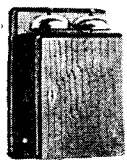
SIEMENS AUTOMATIC TELEPHONES

Siemens "AUTOPHONE" System,

a System of Central Battery AUTOMATIC Intercommunication Telephones
working off PRIMARY BATTERIES.

Write for
Pamphlet T 535.

Designed and Manufactured
at our
Woolwich Works.



For use in

**PUBLIC INSTITUTIONS,
BUSINESS HOUSES, or
FACTORIES**

requiring reliable,
rapid and secret
intercommunication
between different
departments.

All apparatus Standard
British Post Office
Pattern.

View showing a 25-line Unit fully equipped. (Front panel removed.)

Features.

1. Instantaneous service.
2. Called Station bell is rung automatically until answered or until calling station hangs up.
3. Absolute secrecy.
4. Easily extended.
5. Simplest wiring.
6. No operating charges.
7. Continuous service.
8. External Extensions with 2 wires only.
9. No Multiple Cable required for any Extensions.

SIEMENS BROTHERS & CO., LTD., WOOLWICH, LONDON, S.E.

Telegrams: "SIEMENS, WOOLWICH."

OVER 4,000 EMPLOYEES.

Telephone CITY 6400 (7 lines).

Home Branches.

BIRMINGHAM—Central House, New Street.
BRISTOL—30, Bridge Street.
CARDIFF—89, St. Mary Street.
GLASGOW—66, Waterloo Street.
MANCHESTER—196, Deansgate.
NEWCASTLE-ON-TYNE—64-68, Collingwood Bldgs.
SHEFFIELD—22, High Street.
SOUTHAMPTON—46, High Street.

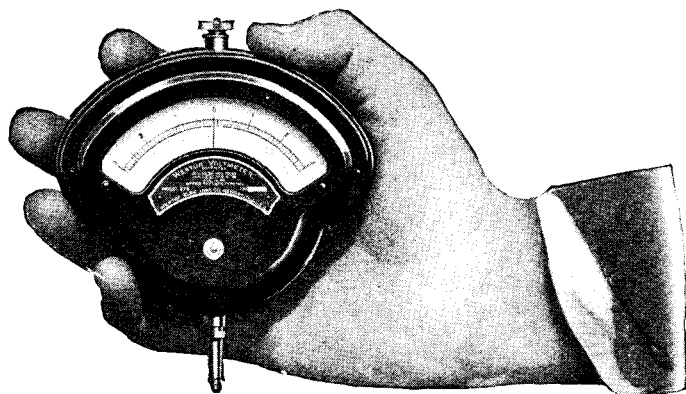
Indian and Colonial Branches.

CALCUTTA—Clive Buildings, Clive Street.
BOMBAY—Rampart Row.
MADRAS—Smith's Corner, Mount Road.
SINGAPORE—1, 2, 6 & 9, Winchester House.
JOHANNESBURG—Siemens' Building.
CAPE TOWN—7 & 11, Waterkant Street.
SYDNEY—42, Bridge Street.

MELBOURNE—Dominion Chambers, 59-61, William Street.
WELLINGTON (N.Z.)—A. & T. Burt, Ltd., Courtenay Place.
DUNEDIN (N.Z.)—A. & T. Burt, Ltd., Stuart Street.
AUCKLAND (N.Z.)—A. & T. Burt, Ltd., Customs Street West.
MONTREAL—Transportation Building.

WESTON

Miniature Precision D.C. Instruments



MODEL 279 BATTERY TESTING VOLTMETER.

The instrument is fitted with a Detachable Spike Terminal and Flexible Lead with Spike Terminal.

DELIVERY FROM STOCK.

Weight, 11.6 oz.

List Price, 49/-

WRITE FOR LIST D3.

WESTON ELECTRICAL INSTRUMENT CO.

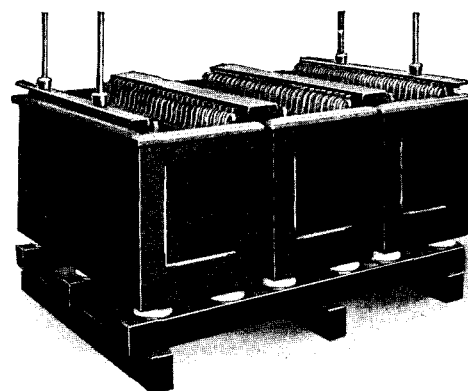
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

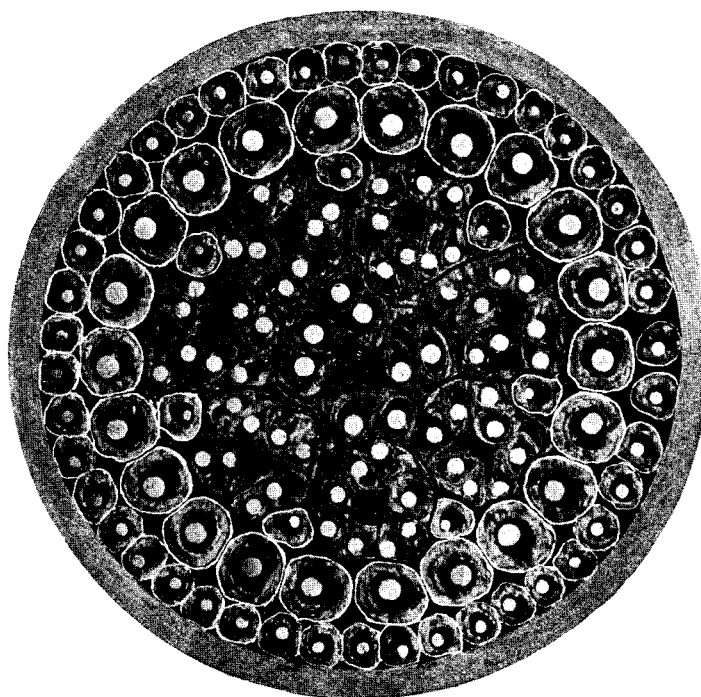
DRY CORE TELEPHONE CABLES.

*Electrical Plant of every description
for Power, Lighting, and Wireless
Installations.*

JOHNSON & PHILLIPS L^{td}

CHARLTON, LONDON, S.E.

ESTABLISHED 1875.



upon selection as the vital factor in judgment. Yet from the Chancellor of the Exchequer who forgot Goschen to the Bishop who forgot to divide by two, everyone's judgment is falsified by the forgotten factor, as much as by errors in observation or deduction.

The best thing in the whole discourse was, however, the definition of a complete life. "The duty of work, the right to live, and the leisure to think are the three prime necessities of our existence, and when one of them fails we only lead an incomplete life." Duty, right, reward; in these triple dimensions only can we serve the future hour.

E. C. G.

THIRTY YEARS AGO.

THE STORY OF THE SIXPENNY TARIFF.

BY JOHN LEE.

THE following article, which at the present juncture will have an especial interest for our readers, is reprinted by kind permission from *St. Martins le Grand* :—

Just at present there is a revival of interest in the 'eighties. "Milestones" has brought us all back to that thrilling section of the Victorian epoch, wedging it between the less interesting 'sixties and the highly efficient, as we suppose it to be, modern day. "The Schoolmistress" has set us thinking of the same period, wondering how it is that it seems to be so long ago, and why shepherd's plaid trousers and whiskers and the stern rule of households have one and all passed away, more or less regretfully. There is room for apprehension, too, that the ladies' costumes of that period are distant from our own in a sense more than is indicated merely by the passage of the years, and one could say something of other matters affecting the ladies. Just imagine being shocked to-day by the bare rumour of a lady riding alone in a hansom cab, or being thrilled by a group of young ladies gushing over the details of an engagement and a secret marriage. Ah me, the days of gush and hansom cabs are over.

In the very heart, so to speak—for it had a heart—of that delightful period, on March 29, 1883, a hundred gentlemen met in Westminster. In those days they met in perfect security. I do not know how they were arrayed, but I imagine that a considerable proportion of them revealed the pompous punctiliousness of the masculine dresses in the plays aforesaid. Some of them, also, were Scotchmen, dressed, I suppose, as Englishmen. It appears from the newspapers of that time that the events of the day occupying the public mind had their affinity with the events which occupy our minds to-day. Some infernal machines had been seized at Liverpool. The "Achilles" statue in Hyde Park began to manifest signs of decay. There was almost a panic as to the feared dangers of a Channel Tunnel. On these themes a number of questions were addressed by a number of gentlemen to a number of other gentlemen. Those questions were answered in due course to the effect that the gentlemen addressed had no further information on the subject. One enquirer was bidden to wait. (It must be remembered that this was 30 years ago). Then the real topic of the day came to its turn. The House (as they call it) awoke accordingly. And someone moved "That Mr. Speaker do now leave the chair."

One would hardly expect this somewhat innocent-looking subject to afford material for a discussion which has had an immense influence on the science of telegraph economics. On that grey March afternoon an epoch was marked in the history of telegraphy. When an American comes to write a book on Telegraph and Telephone Economics—he is sure to be an American—in order to gain a doctor's degree from his *Alma Mater*, he will be rather staggered to find that the difficulty of moving an estimable gentleman from a chair led to a revision of the telegraph tariff. But so it was. One Dr. Cameron rose in his place. He said that in his opinion the Speaker should not leave the chair. Indeed he felt somewhat strongly on the subject, and so far from believing that this particular chair should ruthlessly be vacated he was prepared to go to the other extreme and to urge the reduction

of the charge for inland telegrams to sixpence. It seems to us, later in the day, to be an amazing alternative to put before the House. Students of Procedure have been known since that day to have had surprises, and yet I can imagine the future American, the while that he thirsts for information for his beloved thesis, puzzling his head to know how it came about that the only way to move this admirable gentleman from the chair which so well he adorned was to reduce the charges for inland telegrams.

Meanwhile the tide of traffic outside the Palace of Westminster ebbed and flowed across Westminster Bridge. There were no trams, of course, but there were hansom cabs, and I have Mr. Arnold Bennett's authority for stating that occasionally they contained single and daring ladies. Horse 'buses meandered along, and I grieve to say that, in this romantic and Stevensonian day, some of them were pirates. Slowly the sun sank (in the West); it was bitterly cold, and there are a number of other details which might be added only for the unfortunate fact that the newspapers of that time concentrated their attention so gravely on events of national importance. These are early days indeed, more than ten years ahead of the beginning of things in the shape of a halfpenny press. But within the Palace the one hundred rode steadily and boldly. The Scotchmen held bravely to their cause. It seemed that the old tariff hit them very hardly. It was difficult to get value for their money. Some of them were so driven to hard straits that they had to add "Britons never shall be slaves" or "Britannia rules the waves" to their telegrams. So Dr. Cameron assured a wondering House. To us it may seem strange that they should not have chosen something more indicative of Scots' patriotism, and "Were the last words of Marmion" would have been very suitable.

But the agitation was not begun by Scots. Dr. Cameron made this perfectly clear. Two years earlier the Society of Arts had made the cause its very own. The artistic life of pre-impressionist England had been kindled into flame by the urgent need for sixpenny telegrams. As we can readily believe, the society did not concern itself particularly with questions of finance. It occurred to one of the spokesmen of the society to say that if the proposed scheme did not pay, the difference could be met by the tax-payer. There was no reference to those subtleties of economics which so oppress us to-day. Still the society received an assurance to the effect that if the telegrams were ever run at a loss it would be the most shocking violation of all understood principles of economics, and that it would be nothing more or less than a bounty on trade. John Stuart Mill was duly quoted, and with that the society seems to have been satisfied.

But this new discussion in the Palace at Westminster did not content itself with vague questions on the economics of the time. It meant business. At the outset Dr. Cameron rather startled his hearers by declaring that "from each telegraph office in this country was sent a number of messages which afforded little more than half-an-hour's work per day for each operator." From this he argued that there was room for considerable expansion of business. I have a distinct recollection of the 'eighties in a telegraph office, and I am inclined to think that there was something wrong with Dr. Cameron's figures. The truth seems to be that he divided the number of forwarded telegrams between the number of telegraph offices, forgetting that each telegram had to be received somewhere, and in those days many of them had to pass through several transmissions. However, the statement clearly made an impression on the House. It seemed to suggest that even if there were a fourfold increase in the number of telegrams there would not be any necessity to increase the staff.

Presently the discussion ranged round figures. The speaker told pleasant stories of friends of his who found the present telegraph system lead to extravagance in language. For example, in accepting an invitation to dinner, the friends of Dr. Cameron used this somewhat unwieldy formula: "From William Henry Robinscn to John James Smith, Semething Street, Such-a-town, Such-a-district, Such-a-country, I shall have the greatest possible pleasure in dining with you to-morrow." Whereas, as Dr. Cameron said, they might just simply have said: "Robinson to Smith, Dine with you to-

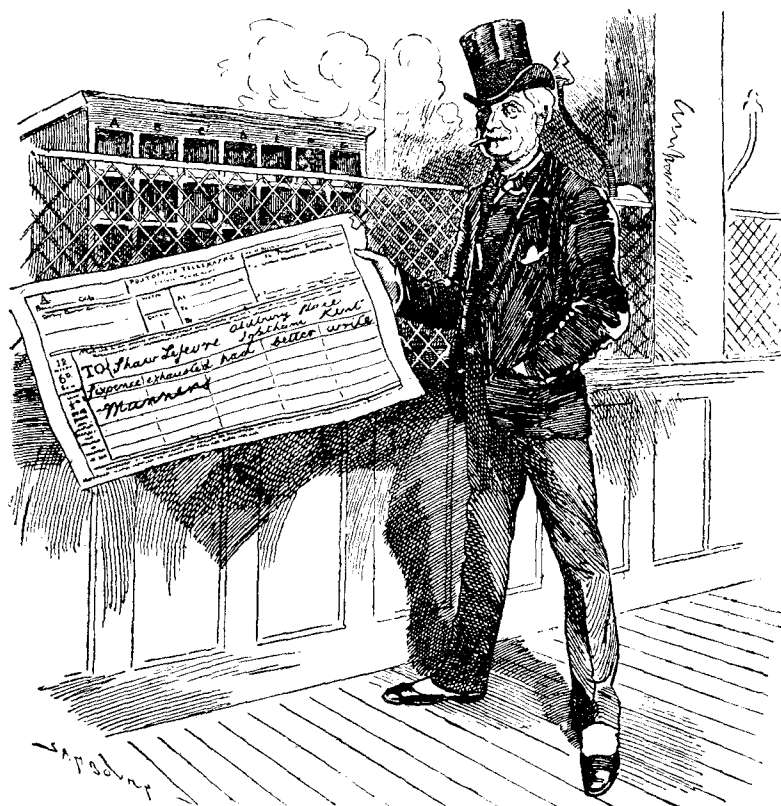
morrow." So, said the genial critic, the number of words could be reduced to seven. He did not add that a kindly telegraph administration would have the greatest possible pleasure in running over the United Kingdom after the Smiths until possibly the dinner aforesaid would be cold. Indeed, Dr. Cameron attached much importance to conciseness. "He would suggest to the Government that the composing of telegrams would form a useful part of the education in our Board Schools." Oddly enough, in "The Schoolmistress," to which I have referred, there is the mention of a telegram which contained only the single word "Bosh." Someone soon learned conciseness, for that play was produced within a year of the passing of the Act.

The discussion roamed still more widely. An interesting use was made of the Suez Canal shares. It was a sum in proportion, so far as I can gather. If the original purchase of the Suez Canal shares was at a cost of £4,000,000, and the value at the time of the debate was £9,000,000, what would happen if the Post Office bought

us whether or not such sweeping statements were received with cheers.) Besides all this he would have nothing to do with the idea of charging for addresses! All these years they had had addresses free of charge, and here we were in the advanced year of 1883 going back on progress. (It makes me tremble to write it.) Someone followed up by pointing out that England had forced the Continental nations to adopt a system of charging for all the words whether they were in the address or the text, and that it would be inconsistent not to apply the same sauce to the English goose as to the alien gander. Fortunately this is anything but a verbatim report. It had already been pointed out that for a brief telegram (such as the "Bosh" message of Mr. Pinero, for example) it was cheaper to send a telegram from the Hebrides to Belgium than across London, and so the sturdy defenders of free addresses seemed to be having rather a rough passage. And yet I would give them a due meed of praise. On both sides of the House they were voicing the cause of the poor, as we shall see later. The resolution was duly passed. The Speaker, after all this to-do, was successfully moved from the chair. But before the resolution was to be crystallised into an Act of Parliament much water was to flow past the terrace.

The public journals fell on the discussion with avidity, especially when the summer sun shone boldly in the heavens and the House (accordingly, in those days) had risen. One northern newspaper applied the parallel of the Hebrides to local conditions. Apparently it cost as much to send a short telegram from Manchester to Ashton-under-Lyne as from the Hebrides to Belgium. The wrath in Manchester was only exceeded by the indignation in Ashton-under-Lyne. Truly the Hebrides bore its Heaven-sent favours with singular fortitude and restraint. I doubt not that telegrams thence to Belgium suddenly breathed a sense of self-gratulation, so far as it could be expressed in somewhat narrow limits, and yet I am confident that Belgium was not distressed by the extravagant additions of "Britons never shall be slaves" and the like. Meantime another agitation was rising. Different sections of the community were beginning to discover that if they were robbed of their priceless privilege of free addresses, telegraphy would be at an end! We shall see presently which sections they were. They wrote letters to the newspapers. They smote their breasts and declaimed that the striking progress of the time, of the most wonderful of all centuries, was at stake. One of the most indignant men I ever met was quite fierce on this subject. He had been accustomed to stamp his telegrams with his name, address and business, in something of this fashion—"FROM William Hildebrand Grant, Fish, Fowl and Flesh Merchant, 25, 27 and 29, St. Peter's Market, X....." He used a stamp to save the trouble of writing it, but he expected a kindly authority to telegraph it—and for nothing. He made the newspapers in our village resound with his protests. But that was 30 years ago.

Two years later, on March 30, 1885, Mr. Shaw Lefevre obtained leave to introduce the Telegraph Acts Amendment Bill. It did not include the tariff exactly as we have it to-day, but it certainly enshrined the principle. He gave some interesting data. The average costs of telegrams to the public would drop from 13d. to 10d., and the average cost of transmitting them would be reduced from 10d. to 8½d. "It leaves us but a small margin of profit, but it may be expected to improve." Also he told the House that out of 24,000 telegrams only 167 were sent by the working classes, though an especially favourable neighbourhood had been chosen for the investigation. So the debate was restricted to the question of free addresses, with here and there a slight aberration. Mr. Stuart Wortley urged that "the address of the consignee should be free, because it contained the only words which enabled the Post Office to perform their part of the contract." Mr. Tomlinson drew attention to the possibilities of the telephone and wondered why it was not worked in conjunction with the telegraph. On a bright day in May, when the political world was seething with excitement on another subject, the second reading took place. Mr. Alderman Lawrence proposed a fixed charge for addresses of any length, to which Dr. Cameron replied by urging the "codification of streets in all large towns"! It was not a little startling to hear,



OCTOBER 1ST "BANG WENT SAXPENCE!"

From "Punch."

Reproduced by the special permission of the Proprietors of PUNCH

the site of Christ's Hospital and introduced sixpenny telegrams? I have no doubt that there is an answer to the sum, but I confess that I am not able to find it. However, the next speaker passed away from financial considerations of this recondite kind, and made a suggestion which deserves to be recorded specially. It was Mr. Causton's idea that there should be telegraph offices one-eighth of a mile apart, and that they should be equipped with telephones, and that messages should be accepted there and delivered at a cost of twopence (apparently within a specified area). It showed no common insight to make such a proposal 30 years ago, and we can well believe that the House was astonished. Indeed some of the sturdy supporters of the sixpenny tariff seem to have been horrified.

Hitherto the debate, in spite of the Scotchmen, had had a decidedly metropolitan air. But this could not last for ever, and so a brave general came into the gap. He declared without the least hesitation that there were three places in his constituency which yearned for and demanded the telegraph and that they would not be happy until they got it. "The convenience of the people should be considered and not the cost." (I do wish Hansard told

in the course of the debate, that the telegraph "was abused by anxious mothers and by enthusiastic lovers, who telegraphed each other two or three times a day." Perhaps both classes have got a little out of fashion in our day, particularly the enthusiastically telegraphic lovers.

So far all seemed well. But there were clouds in the political sky, and they chose June as a meet moment for their gathering. The best laid schemes of politicians (men and mice) gang aft a-gley. Mr. Gladstone's diary has a significant entry,—"June 8. Pitiless rain. Cabinet 2-3 $\frac{1}{2}$. Spoke on Budget. Beaten by 264—252. Adjourned the House. This is a considerable event." It was nearly a considerable event for the Telegraph Acts Amendment Bill, and there were many prophets who declared that it would be jettisoned. Once more there were tears in Manchester and in Ashton-under-Lyne, but even still the Hebrides kept calm and made no particular fuss about its (or their) special advantages. But the prophets were wrong, and the mere resignation of the Cabinet was not allowed to interfere with economic progress. The rain (of tears) stopped in Manchester when it was announced that progress would be made with the Bill. At this point we have one of the most beautiful incidents in the story of party in England, but this is not the place in which it can be handled. At any rate Lord Morley may be quoted: "It is impossible not to observe the dignity in form, the patriotism in substance, the common sense in result, that marked the proceedings alike of the Sovereign and her two Ministers." The new Prime Minister agreed to go on with Supply, and it came about afterwards that the Telegraph Bill was saved.

The Bill was championed from the Opposition side of the House and the most interesting debate of all took place on July 30. By this time the feeling against charging for addresses had become very acute, and an amendment was moved from the Government side providing for free addresses and three text words for sixpence. There can be no doubt whatever that this amendment put into shape a sincere wish that the telegraph might be more useful to the masses of the population. All credit to the humanitarianism which inspired it. But it was not the poor, or the masses who were articulate. Seedsmen and medical men were most prominent in the public agitation, and a letter was read to the House from one of the medical professors of Glasgow University which deserves to be quoted: "Medical practitioners are liable to be summoned at any time to the assistance of persons of whose mere existence they have never before heard, and cases may easily occur where a message of the greatest possible emergency may be transmitted without forethought as to the embarrassments arising from an imperfect address. In such cases the omission of even one or two words, either from undue economy, or from the habit acquired of using an unusually short form of address for telegraphic purposes, may cause the recipient of a telegram a very great deal of trouble." In the end the amendment was defeated by 108 to 62, and by the curious arrangement which had been adopted, Mr. Shaw Lefevre, from the front Opposition bench, moved to report progress. One amendment was negatived, providing that "the names of streets, gardens, squares, parks, crescents, crosses, lanes and so forth, and the names of islands, bays, harbours, levels and so forth, should be counted as one word only." Another amendment was accepted changing "one penny for two words or parts of two words" into "one halfpenny for each word." And so the Bill passed its third reading, not without a murmured complaint that "Piccadilly," with ten letters, was counted one word, while "Pall Mall," with eight letters was counted two words, a plea which left the sponsors for the Bill unmoved. So the tariff for telegrams was reduced to a minimum of sixpence, with the addresses to be charged, irrespective of the influence which it might have on anxious mothers, enthusiastic lovers, seedsmen, and medical practitioners. Thirty years have passed and motherhood and love-making and the sowing of seed and the healing of the sick are apparently unimpaired.

I dream fondly of the American student of the future for whose behoof I have attempted to write, to save him the trouble of searching Hansard for facts. He will find, I fear, but little entertainment or enlightenment in these pages, for I am temperamentally

incapable of making a silk purse out of Hansard, or of filling a silk purse out of anything. That same American student, no doubt, will have sat at the feet of one Taussig at Harvard, and will have learned exactitudes of economics, of profit and loss, of capital and revenue, of the limits of public utilities, of public management and of scientific control. Later on, no doubt, his studies in England will lead him to the consideration of the extension of the telegraphs to remote villages and barren plains, and to the appreciation of a Jubilee concession which provided for a free delivery as far as three miles and much farther in some instances. Then I can imagine him stretching his legs and lighting yet another cigar and, in thus wise, musing: "I have gone around this proposition. It gives me cold feet. Call it business? No! Call it economics? No! It is philanthropy!" And philanthropy as a subject for a doctor's degree in economic science is a poor thing, excellent though it may be in itself.

And in saying this the student will be close to the truth. As we look back on the Victorian age we may see what may appear to be eccentric errors in economics, and curious blunders in business. But amid it all the voice of the multitude was distinctly heard. The spirit of philanthropy of that day was a real and sincere impulse. The blaze of pyrotechnics which, in his last book, Mr. G. K. Chesterton showers before the Victorian background gives us occasional sharp and clear glimpses. One of them is especially illuminative. He sums up the spirit of the age, in dealing with the person of Macaulay, in a way which bears upon the motives which led to the cheapening of telegrams: "Above all Macaulay typifies the two things that really make the Victorian age itself, the cheapness and narrowness of its conscious formulae, the richness and humanity of its unconscious tradition." It is in respect of the tradition rather than of the economics that the cheap telegraph tariff must be considered.

THE FUNCTIONS OF A SUPERVISING OFFICER.

THERE are few persons in the Postal Telegraph Service, even those whose connexion with it has extended to less than six months, who have not formed decided opinions on the merits, weaknesses, whims or questionable characteristics of the supervising classes. With this acute criticism of the persons in actual control of telegraph business, there is at times a broader estimate which includes in its valuation, not merely the individuals, but the system which has permitted those now in authority to assume their present responsible and arduous duties. Taking the Service generally, it will hardly be denied that dissatisfaction with superior officers exists in some degree wherever a large staff is employed, or where the requirements of the Service bring subordinates into constant relationship with controlling officers. It is pleasant to find, although the occasions are far too rare, that some officer gifted with uncommon powers has succeeded in winning the respect and admiration of those he controls while gaining the confidence of his own superiors. On the contrary, however, one meets with thoughtful, capable and conscientious officers who maintain that the responsibility laid upon a supervising officer is of such a kind that he can only discharge it adequately by foregoing popularity with those of lower rank. That such a conclusion should be reached is, from every point of view, most regrettable, and possibly the question is one worthy of a brief discussion in this journal.

The assumption underlying this pessimistic attitude is that the interests of employer and employed come into sharp and hopeless conflict; that the gain on one side involves loss on the other; that increased emoluments and diminished effort are naturally the ruling motives with wage-earners, whilst inflated output and reduced expenditure are the normal aims of the captains of industry. Fortunately, in the science which deals specially with the economic relations of mankind, there has been a growing recognition of good will as an important asset to the employer and an admission that where this spirit is absent through any fault of the human element, there can be no sound economy. Conversely, the well-being of the captain of industry is vital to the economic welfare

of the wage-earners. This is merely an extension of the doctrines long ago admitted into moral and political discussions that society is organically related, so that the injury of any member is the misfortune of the whole; that, even more than physical organisms, the intellectual and spiritual unity which manifests itself in human relations requires us to co-operate in all our dealings, if efficiency and progress are to be realised. The practical difficulty still remains even when the truth of these principles is admitted. A supervising officer has only a limited sphere and can accomplish but a little in the direction of securing the spirit of good will so valuable to the employer. His position is difficult because to some of his subordinates he is the personification of the Department which they think has not succeeded in convincing its staff that in its dealings it has sought to follow some principle of justice as between the public and its servants. He has to contend against the evil legacy of a bygone time when the control of staff was entrusted to unsuitable officers with large discretion, seldom leniently or wisely used. Yet, with all these disadvantages, he has functions to perform which can easily be under-estimated or overlooked. It is essential that he should have clear ideas as to what these are and in what spirit they are to be attempted.

His first duty is undoubtedly that of organisation. If officers would expend a fraction of the energy, now consumed in irritating and fussy fault-finding, in serious deliberation of the distribution of staff and traffic, there would be a distinct gain to all concerned. This organising ability is at present a heaven-sent gift, for no tuition or guidance in method has ever been considered necessary to develop a successful supervisor. Indeed, the discussion of problems of traffic has to be carried on at meal-times or by stealth. The accrued wisdom of predecessors remains an unpolished jewel, carried home at last by the owners for personal use in some obscure village.

Another important duty is that of leadership, in the best sense. Unless subordinates feel that there is one in command who can be referred to in cases of difficulty with a certainty of real help being given, there can be no cohesion between the officer and his staff. This throws upon the supervisor the necessity for acquiring such intimate knowledge of the details of his business that he may never be at a loss in an emergency.

A further duty must be the exercise of tact and discretion. The Telegraph Service has suffered enormous injury from the misguided endeavours to frame a rule for every contingency, and this has produced an automatic type of person who is helpless in the absence of the relative rule. It was a favourite topic with the ancients whether or not a perfect code of laws or a perfect administrator would be the better for a State. We cannot hope either for a perfect rule-book or a perfect supervisor, but we cannot dispense with the need for intelligence, judgment and strength of will, and too often the framers of rules have legislated for automata. A law or rule should be regarded as the expression of the results of the best experiences in the Service, not to be slavishly followed, but to be the welcome help of a person seeking to arrive at a sound conclusion. On the part of the staff there should be encouraged by strict impartiality and justice an assurance that discipline is what the word formerly indicated, a process of training for the benefit of the individual and not for the satisfaction of malevolence.

The duties of courtesy, consideration and tolerance are indispensable in every walk of life, but there is so constant an outcry against their absence in the Telegraph Service that one can only wonder whether the perpetual struggle against delay may not have produced a brusqueness and impatience which engender much ill-feeling. To enumerate the qualities necessary for good supervision would be to exhaust the meaning of personality, that unaccountable aggregate of emotion, will and intelligence which silently yet effectively influences those around us. A successful supervisor learns and remembers, but also forgets; he sees and is blind; he is conspicuous in his influence but concealed in his operations; he is not a driver but a leader.

LARA.

AUSTRALIAN AND CANADIAN GOVERNMENT TELEPHONE SYSTEMS.

By W. H. GUNSTON.

THE telephone system of the Australian Post Office, which embraces the whole territory of the Commonwealth, has achieved a considerable measure of success judged from the standpoint of development. There is 1 telephone to every 37 inhabitants, and although this is not high if judged by American standards, it may be observed that it is higher than that of any European country with the exception of Norway, Sweden and Denmark. The Canadian Government telephone systems are confined to the western provinces of Manitoba, Saskatchewan and Alberta. These are by no means the most populous or important of Canadian provinces, although their recent development has been rapid and their future is promising; and moreover the Government authorities do not carry on the entire service, numerous small companies operating some of the outlying districts. They own, however, the principal telephone system for each province, of which the development is high, approximating rather to American than European standards. In Manitoba there is a telephone for every 10.13 inhabitants, in Saskatchewan for every 20.73, and in Alberta for every 12.41. But it will be seen from the following observations that whilst the Australian system is run at an annually increasing loss, the Canadian systems each show a profit, and the debateable point arises how far a high development, however admirable from a public service point of view, is justifiable when it entails a loss on the public purse.

AUSTRALIA.

On Dec. 31, 1913, there were in the Commonwealth 107,553 telephone lines connected with 1,181 exchanges, as against 95,965 lines connected with 1,032 exchanges in 1912. The number of telephone stations in the various colonies was as follows:—

	1912.	1913.
New South Wales ...	47,489	52,180
Victoria ...	33,775	38,737
Queensland ...	13,692	16,420
South Australia ...	9,890	11,114
West Australia ...	9,198	10,025
Tasmania ...	3,435	4,223
	117,479	132,699

On June 30, 1914, there were 13,489 telephones in Sydney, or 35,625 including suburbs; in Melbourne 16,802, or 31,167 including suburbs; and in Adelaide 7,505, or 8,916 including suburbs.

The war has had its effects on the development of the telephone system, even in Australia. Compared with the three months August to October, 1913, the number of new applications in the same three months in 1914 fell by 15 per cent. in New South Wales, 26 per cent. in Victoria, 3 per cent. in Queensland, 42 per cent. in South Australia, 32 per cent. in Western Australia, and 47 per cent. in Tasmania. On this the official report says:

It may not be wise at the present moment to draw any definite deduction from these figures as governing the Department's future practice; but the outstanding fact is to be noticed that there has been a reduction in the number of applications for telephone services, the reduction for the Commonwealth being 22 per cent. as compared with the corresponding period a year ago, and 34 per cent. as compared with the three months preceding the war. Whether or not the reduction will be maintained is a matter which the future alone can show, but the figures demonstrate the point to which attention has been directed on several previous occasions, that in designing works connected with the telephone systems of the Commonwealth the closest foresight must be exercised and every fact taken into consideration

which has any bearing upon the demands upon the Department. All these facts are being given the closest attention by your engineering officers.

It is quite possible that a portion of this reduction may be due to the drought, but this is a factor which cannot be estimated. Close watch is being kept upon the progress from month to month, and the Department's programmes as to works will be guided by the results.

If the three months from August to October, 1914, can be taken as a criterion, when the average decline in new orders was 22 per cent. as compared with the corresponding period in the previous year, Australia will still be progressing at the rate of some 12,000 stations a year, which in the present conditions is very satisfactory.

When, however, we turn to the financial side of the question, the position is much less favourable. The results of working the telephone branch of the Australian Post Office, analysed under States, are as follow:—

	1912-13.			1913-14.		
	Loss.		Profit.	Loss.		
	£	s. d.	£ s. d.	£	s. d.	
New South Wales	124,549	4 1	—	171,568	19 5	
Victoria ...	55,644	9 7	—	60,384	5 10	
Queensland ...	18,985	11 6	—	21,729	0 8	
South Australia (including Northern territory) ...	—		1,955 11 8	3,129	3 7	
Western Australia	13,574	9 6	—	29,811	13 1	
Tasmania ...	10,958	13 8	—	9,801	1 11	
	£223,712	8 4	£1,955 11 8	£296,424	4 6	
Net loss, 1912-13	...	...	£221,756 16 8			
Net loss, 1913-14	...	...	£296,424 4 6			

The rates for exclusive service in Australia are £4 for places with over 100,000 inhabitants (of which there are only three or four), £3 10s. for places with 10,000 to 100,000, and £3 for the smaller places. The subscriber who makes 4,000 calls a year gets two calls for 1d.; he who exceeds this number gets three for 1d. That is to say that in the largest cities a subscriber gets a direct line with 500 free calls for £5 0s. 10d., and whilst in a little place he can get a direct line with 240 free calls for £3 10s. When one considers the difference of the purchasing power of a sovereign in Australia and in Europe and compares the Australian rates with the average rates in the larger European countries, it is not surprising that the service works at a loss.

A committee has been formed to investigate the working of the Telephone Service and has prepared a report which is now under investigation. It may here be remarked that low rates once established are extremely difficult to abolish, owing both to political and economic difficulties, a fact which some European administrations know at the present time to their cost.

CANADA.

In Canada, as it already has been said, Government systems exist only in Manitoba, Saskatchewan and Alberta. The following table shows the proportion of Government stations to those owned by other authorities:—

	Total telephones.	Owned by Government.
Manitoba ...	49,146	46,453
Saskatchewan ...	26,023	16,746
Alberta ...	37,118	26,811

The revenue and operating expenses for the year ended June 30, 1914, of the three governmental systems was as follows:—

	Revenue.	Operating expenses.
Manitoba ...	\$1,786,842	\$1,321,107
Saskatchewan ...	\$836,328	\$580,677
Alberta ...	\$880,559	\$518,449

The business rates in the large towns are £12 10s. in Winnipeg (Manitoba), £7 5s. 10d. in Saskatchewan, and £8 15s. in Alberta,

which may be considered as fairly moderate, although the Winnipeg rate is higher than that for Montreal and Toronto, which are supplied by the Bell Company. The development, as I have said, is high and, on the whole, compares favourably with the populous provinces of Ontario and Quebec. In fact the Canadian Government systems as a whole seem to be in the most satisfactory condition. The telephone development of Canada is higher than that of any other part of the British Empire, there being one telephone for every fourteen inhabitants; and it will be observed that Manitoba and Alberta with one to ten, and one to twelve respectively, improve even upon that excellent figure. Mention should be made of the extraordinary development of British Columbia (where the chief administration is the Bell Telephone Company) which has a telephone for every nine inhabitants.

BOOKS FOR OUR SOLDIERS AND SAILORS.

By H. MONKS.

EVERYBODY'S business is nobody's business says everybody, but no one need not accept this statement too implicitly, for the counsel of perfection will certainly never include everybody. At the time I am writing it is everybody's business to turn out from their bookcases all surplus stock which can be handed over for the delectation of the soldier and sailor somewhere on active service.

Should the spirit of true charity be triumphant then not only the "waster" element—the "bad bargain" item—will be turned over for the troops, for though we love our volumes well, yet shall the bitterness of parting be sweetened by our greater love for the men whose lives are in pawn for an Empire's freedom.

Sometimes communism in effort works well and never better than when the end aimed at is in inverse proportion to the private benefit of those who work. If "Sister Sue"—or whoever it may be by whom shirts are sewn for soldiers—were called upon, though never so loudly, to sew skirts for Susan, then, were England's glory dependent on the result, it might fade quickly into that limbo of forgotten memories to which every devout (or should it be devilish) German thinks he is quickly pushing it.

But when the fortunately large family of Susans knows that someone, somewhere perchance in France, someone whom probably they'll never see, and whose voice they will never hear—is implicitly trusting in all his wants being supplied, then "Susan" keeps faith with someone even though the blessing of the donor and the thanks of the suppliant are merely sighs which hearts alone may value, and which words might interpret all wrong.

I wonder whether it was in the War Office or in the Post Office that a super-Susan was born. An ordinary goddess would have suggested that needle and thread had grown wearisome and, waiting for inspiration on newer lines, have found her workers disorganised before their new sphere of usefulness could be determined. Not so the leader of communal comforts for our comrades in arms.

Without dropping the stitches so lovingly interwoven in the articles of bodily comfort, this super-Susan suggested that the literary threads which have been woven for the comfort of the mind should also be enjoyed by our soldiers. And now "Sister Sue" is quite evidently managing to do two things at once; and quite evidently too—doing them extremely well.

Within a week of the announcement that the Post Office would undertake to forward free to our soldiers and sailors any books entrusted to their charge, we had received at Sheffield something like 1,000 items of more or less literary merit.

The fact that the Post Office had decided that "books handed in merely to propagate a particular view" could not be accepted, gave rise to a *contretemps* which necessitated all the skill of a plausible tongue to adjust. A dear old lady called with a year's copies of the Bolstonhaugh Parish Magazine, and in view of the regulation quoted, and with, perhaps, not too apt a choice of words, the

counter clerk observed that she scarcely knew whether they were quite "proper" to send to the troops. Never before had the good donor been accused of adhering to an "improper" creed; never before had the "Faith of her Fathers" been called in question, and only the smooth tongue of diplomacy could persuade her that nothing could be more orthodox than the views of her vicar, and nothing more foolish than to withhold from the soldiers the joy to be derived from his printed words.

What a happy-go-lucky, wise, unthinking, superficial yet profound, and withal a most lovable public it is which responded to the appeal.

There is something about the mere cover of a book which suggests all manner of happy possibilities, something about the margin of the pages which your book-lover realises, but would be loth to explain; and if the title of the book doesn't mean much, or rather, less than nothing—if you will agree that the negation of nothing doesn't mean something—still there's the author's name which must mean everything. Once you've read three books by any author you know just what to expect from him. For instance, no one can be in doubt after reading *Anna of the Five Towns*, *Leonora* and *Clayhanger*, that Arnold Bennett sticks to the Potteries like a limpet to its rock. Should you by any chance then read *The Grand Babylon Hotel*, you find, of course, that he doesn't; but the shock is only slight, and your pride in the knowledge of his versatility makes recovery both rapid and pleasant.

Still there is always something about a book, long before its literary value is appraised, which causes the reader to think. It may be the splendour of its binding, the prodigality of its margins, the clarity of the printed letter, the quality of the paper, or perhaps alone its title. And so we look at the first book amongst the early arrivals.

Grammar of the English Language (1844 edition). Here's food for thought indeed. Alas—history will never record what Tommy in the trenches might have thought about the matter; and it would baffle the printer's exclamation marks to even venture to portray his probable profanities.

Well, who shall judge of the motive behind the impulse that resulted in the book coming along. It was sent for the soldiers and the sender could no more hope that all poor wounded comrades might find consolation in its undoubted logic than the widow could hope that her mite would of itself sustain the propaganda that was to make the world more Christlike. The motive was no doubt good, and although the cynic may be inclined to suggest the possibility of the comparative tense may I in turn propound the superlative; for the best from your stock of books cannot be too good for the cause for which it is given.

Without going too closely into the art of discrimination by which has been selected so wonderfully varied an assortment of books and magazines, we might agree that the book which has pleased is chosen and passed along in the sublime belief that it will, therefore, please others. This line of reasoning is not necessarily correct. If pleasure might be measured in avoirdupois the German Empire's load would be light indeed in comparison with Miss Surburbanite's, after reading say *The Outwitting of a German Spy*.

And not less fallacious would be an attempt to place an author in the scheme of popularity by merely observing his numerical representation in the collection.

Rightly or wrongly one might think that the placid outlook of life from the pen of A. C. Benson would appeal to men who live through the weeks or months of the rattle of musketry and the roar of guns; and yet a single copy of *Through a College Window* is his only evidence in the first hundred books. No one will cavil, however, at Max Pemberton and R. L. Stevenson cropping up four times in the same number. Dumas and Dickens will, I am sure, find as many devotees at the front as apparently there are worshippers at home; and if Blatchford has less volumes to his credit in the same arbitrary hundred, surely it must be that their owners loved them too dearly to bear the pang of parting.

If it is true that "Jack has a Girl in every Port," and if it is true that "Every nice Girl loves a Soldier," then it is equally true that "Love of their Lives" is anything but a thing apart, and the six novels by Charles Garvice are apparently justified.

It may be a far cry from *Der Bibliothekar*, by Gustav von Moser, to *Wheatsheaf*, the organ of the co-operators—but there they both are. Apparently nothing comes amiss; and if any Tommy doesn't see "It" in his bookshop window at the "Front," if he'll only go inside and ask—why he'll no doubt find it right there.

The boys of the "Dandy Fifth" or the "Devil's Own" obtained "Novelties" in ties and socks when at home. Now that duty has called them abroad they shall still have their novelties supplied—but novelties in books.

What can our brave lads—lusty in limb but no doubt slaves of the midnight lamp—desire more by way of novelty than *The Application of Psychology to the Science of Education* (Herbart); *The Mechanics of Architecture* (E. W. Tarn); *Treatise on Counterpoint, Canon and Fugue* (Sir F. Ouseley). And having leisurely imbibed the wisdom of the sages a sigh of relief escapes when Thackeray's *Vanity Fair* is by chance discovered. Alas for vain imaginings! The early Victorian was the era of three volume novels, and so it happens that an attenuated *Becky Sharp* may be ruthlessly delivered into the hands of the Phillistines. Nothing will the finder learn of Becky whose precocious childhood is the delight of volume 1; nor yet of Becky—the woman of brilliant parts whose wit gains the adoration of man and drives woman to distraction—for she is of volume 2—but only of Becky the disgruntled failure (as the world judges failures) Becky the outcast, the old woman, Becky in fact at the stage of volume 3; and Becky should in memories fair garden never be anything but young.

The Victorian era gave us also the book of many titles, and so we have *Agatha Singleton, or the Cottage on the Cliff* (a seaside story); *Anna Lee, or the Maid, the Wife, and the Mother*. Shakespeare is there of course both in single plays and in "complete works." The "Moderns" are represented by H. G. Wells, A. E. W. Mason, Masefield, Maxwell, and Pugh; but we search in vain for George Bernard Shaw.

The number of volumes sent from Sheffield in one batch has been as low as 1,000, and although at the other extreme of the scale upwards of 1½ tons of books have been sent forward in a week, it is evident that many book-lovers have still the pleasant task before them of hunting out their "spare" reading matter. Time, more inexorable than many tyrants, still loans to us but 60 minutes for every hour, and so it is that to-day breeds troubles for to-morrow because the tasks of yesterday do occupy the mind and push aside the things that ought to be our present care.

"Pray make haste" with your books; but the following titles will suggest that certain classes are already sufficiently represented:—

- (1) *Handbook of the English Tongue.*
- (2) *Watts Logic.*
- (3) *Human Physiology.*
- (4) *The Vital Statistics of London.*

Although our dear old British "Tommy" may not be the finest exponent of the King's English, neither is he likely to desire to "improve" his leisure hours in the trenches by the perusal of No. 1. There is no objection to No. 2 perhaps except that, as warfare is in itself so illogical in the twentieth century, the recipient might be offended at an insidious attempt to improve his powers of deduction; and *Human Physiology* and *Vital Statistics* have too obvious a reference to the penetrating possibilities of shrapnel to be really welcome to the impressionable mind. If, moreover, we are agreed that a well-bound treatise on *How to Furnish a House on an Outlay of £500* might breed sarcastic comments from Tommy in his "Dug-out," it may safely be left to the readers of the TELEGRAPH AND TELEPHONE JOURNAL to direct the energies of their friends into more suitable channels.

THE NEW POSTAL AND TELEGRAPH CHARGES.

THE first report of the Committee on Retrenchment of the Public Expenditure was issued on Sept. 21. The feature of the report is the all-round increase of postal charges recommended, and these have, to a large extent, been embodied in the Budget proposals.

The Committee say they propose at a later date to deal with departments in detail, but for the present they think it best not to delay the submission of certain recommendations which would secure an immediate economy or increase in revenue.

In regard to the Post Office, the Committee have given particular attention to those services which, so far as the total cost of the Post Office can be apportioned between its various branches, must be regarded as unremunerative, and in which, therefore, the present rates amount to a subvention from the taxpayer to particular individuals or industries. "While in time of peace," the report continues, "it might be arguable that such a subvention was desirable on other than financial grounds, the Committee cannot regard the continuance of such arrangements at the present time as defensible; and they consider that if these services cannot be made actually remunerative the rates should at least be raised to such a point as will make them as nearly as possible self-supporting."

They are also of opinion that in existing circumstances, in addition to the restriction of the usual facilities, a substantial increase of the ordinary postal charges is expedient and would be accepted without complaint. They recommend accordingly:—

(1) The imposition of a special war tax of one halfpenny on every internal postal communication (whether letter, postcard, postal packet, newspaper, or parcel) in addition to the standard rates of charge applicable to each case. This war tax would not be chargeable on communications to foreign countries which are members of the Postal Union, nor should it apply to communications addressed to part of the British Empire or to His Majesty's forces in the field.

(The Government have not adopted the extra halfpenny on letters, but have reduced the weight.)

(2) The increase of the standard rates of inland letter post (in addition to the war tax of a halfpenny) as follows:—Weight not exceeding one ounce, 1d.; two ounces, 2d.; and $\frac{1}{2}$ d. for every additional two ounces.

(3) The increase of the standard rates of inland parcel post (in addition to the special war tax of a halfpenny) rising from 5d. for 1 lb. weight to 11d. for 11 lbs.

(4) The increase of the standard poundage on all postal orders by one halfpenny.

(5) The increase of the standard charge for inland telegrams to 9d. for the first twelve words, the charge for each additional word to remain at one halfpenny, as at present.

(6) The increase of the standard charge for inland press telegrams to 2s. 6d. for the transmission fee, and 8d. for the copying fee, covering in each case 75 words by day or 100 words by night. The Committee are informed that the existing charges involve a loss on this service of more than £200,000 per annum, and their proposal represents the minimum increase which will suffice to make it self-supporting.

(7) The increase of the standard charges for telephone calls as follows:—
An additional 1d. for each district call made at a public call office.

An additional 3d. for each trunk call.

(8) The increase from £17 to £20 of the "unlimited rate" of telephone subscription in London, and similar increases in the ordinary rate in the country.

ADDITIONAL REVENUE FROM THE NEW CHARGES.

The following estimates are based on the assumption that the new rates will be operative from Nov. 1. In some instances, especially where statutory authority is not required, it may be possible to introduce the new rates before that date, but the effect on the anticipated revenue would not be considerable. The estimates for the remaining portion of the present financial year being given first, followed by those for 1916-17:—

Letters, £600,000; next year, £1,430,000.

Inland postcards, £400,000; next year, £975,000.

Circulars, &c., £290,000; next year, £700,000.

Registered newspapers, £100,000; next year, £230,000.

Parcels, £90,000; next year, £220,000.

Postal orders, £25,000; next year, £60,000.

Ordinary telegrams, £170,000; next year, £410,000.

Press telegrams, £100,000; next year, £260,000.

Telephones, flat rate, £25,000; next year, £280,000. Trunk

service, £120,000; next year, £290,000. Call office fees, £60,000; next year, £140,000.

Total gain to Exchequer, 1915-16, £1,980,000; 1916-17, £4,975,000.

In addition it is estimated the new proposals will mean a saving in expenditure of £205,000 next year.

The above return, issued as a separate paper, shows that Mr. McKenna has adopted all the recommendations of the Committee with some slight modifications. The addition to parcel post rates is 1d., making the scale run from 4d. to 1s.

The following are the new rates as adopted:—

The unlimited service subscription in London will be increased to £20 for first connexion, and £17 for second and subsequent connexions; and in the Provinces to £12 and £10 respectively.

Two-party lines are increased to £7 10s. and four-party lines to £5. The residence rate of £8 per annum in the Provinces remains unaltered.

Trunk fees—a general increase of one-third, except that 1d. trunk fees become 2d. and 2d. fees 3d.

Call Office Fees.—In the London telephone area the call office fee for each period of three minutes is 3d. instead of 2d.; and in the Provinces the call office fee is 2d. instead of 1d. for local calls. The call office fee is payable in addition to junction fees and trunk fees. It will be seen that the special call office fee of 2d. in connexion with trunk calls in the Provinces remains unaltered.

CRITICISMS ON THE NEW CHARGES.

FROM "PARLIAMENTARY DEBATES," Vol. 74, No. 94.

Sir W. Byles (after referring to the postal charges) said: I understand it is proposed to increase the charge for Press telegrams, and it was put forward, and it has often been put forward, that the Post Office Department is losing money by the cheapness of Press telegrams. I do not believe it at all. I think the calculation is altogether based on a fallacy. I am old enough to remember—indeed, I was connected with the Press at that time, when the cheaper Press telegrams were introduced, and it was said then, as a recommendation of the change, that the wires, which now belong to the State, were all idle during the night, and that this was a use of what might be called idle plant and must be regarded really as a waste product, and if the profits of the Department are calculated on that basis I do not for a moment believe that Press telegrams would be found to be unremunerative, but very much the reverse, for now the wires are being used all night through for sending Press telegrams. Then, of course, the news so conveyed is of enormous use to the public, and in so far as that is restricted I think the public will severely suffer. In order to make such vitally important changes in domestic intercourse, and in the conduct of newspapers and to justify such important innovations, you ought to have an equivalent result. You ought to have a game that is worth the candle, and I do not think it is, and I think my right hon. friend will hear of it from a good many quarters.

The following criticism appeared in an editorial in the *Yorkshire Post* on Sept. 22, the morning after Mr. McKenna's speech on the Budget:—

THE "YORKSHIRE POST'S" CRITICISM.

It may be that we write too many letters, and send sixpenny telegrams about business which might wait a day and be transacted by letter; and that it is Mr. McKenna's intention to teach us a lesson in economy and in the value of deliberation. Some of his proposals in this connexion will doubtless be acceptable generally, for some of the postal services appear almost more than the charge warrants. Perhaps we may be open to criticism if we question the propriety of Mr. McKenna's attack upon newspapers—his desire that readers should pay more and receive less for their money, and that speeches by Members of Parliament, and candidates, and Ministers should be greatly curtailed. Certain it is that the orators who, in the House of Commons, cheered Mr. McKenna's decision to make a very large increase in the charge for Press telegrams, will be seriously disconcerted when they realise that newspapers may hesitate to telegraph their speeches—though possibly the reading public may not find themselves a penny the worse. We do not accept Mr. McKenna's suggestion that at present the Press does not pay full value for the telegraphic services rendered by the Department; though the official figures may not be open to challenge, they represent only one part of the revenue contributed to the country by the Press, as a result of the cheapness of the telegraphic service. It is not practicable here to detail the actual facts, but no doubt they will be laid before the Chancellor of the Exchequer in the course of the next few weeks. So, too, the present postal charge for newspapers may be justified by conditions outside the figures which officials might produce as indicating the cost of the service.

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising { Mr. JOHN LEE.
Committee - - - { Mr. J. W. WISSENDEN.
Managing Editor - - Mr. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

OCTOBER, 1915.

[No. 13.]

THE TELEGRAPH TARIFF.

To many of us, who had other hopes, the increase in the telegraph tariff is a sore disappointment. To say this is not to complain. In the fulfilment of its patriotic duty the Telegraph Service has done splendidly and there is no reason why the fact should not be stated. It has given up for direct military service a larger proportion of its skilled staff than is generally realised: it continues to give a telegraph service for the commercial and social needs of the country, some of those needs being more acute than at normal times, and in addition it is performing what may be called indirect military service on a scale which only those intimately concerned can comprehend. Now it helps to shoulder the financial burden. It must be to some extent at a personal cost to the members of the Service. In facing the fact there need be no repining. We are confident that in due time, when the secrets are revealed, the nation will remember the sacrifice, none the less a sacrifice because its full compass cannot be realised at the moment.

Those who had other hopes may perhaps see the fulfilment when the time comes for a thorough re-consideration of the tariff. It may be that we shall have a careful study of the complex problem, the social needs as distinguished from the economic needs, the relation of telegraphs to telephones in respect of rapidity of service and in respect of local and long distance traffic, the adjustment of supply to the varying details of demand. The new tariff will give us rich and ample material for this study. It will put the service to a severe test, the prompt adjustment of the organism to totally different conditions, but out of that adjustment we may learn in what way, in happier times, the service can be adjusted to what we are convinced will be wider demands than any of us can foresee, both national and international demands.

It was natural that the rapidity of telegraph invention which has marked the past few years should lead the optimistic to look

forward to a telegraph service so developed that it would touch the public at more points than it has done in the past. The general result of invention in the world at large has been to reduce the cost of the product and so increase the demand. Those who looked to this phase of telegraph development with particular hopes will feel the disappointment all the more keenly. But here again it may be said that when the time for re-consideration of the tariff comes round it will be all the more helpful that the actual utility of the newer machines should be known. At any rate there will be an opportunity for taking these new factors into account which will enable a more scientific tariff to be devised than that which was devised in 1883.

THE TELEPHONE SURCHARGE.

WE have frequently referred in these columns to the difficulties in carrying out telephone construction works under the existing conditions; but we cannot well deal with the question of the telephone surcharge without tracing the causes of those difficulties. Many of the Engineering staff were either members of the Territorial forces or reservists of the Army or Naval forces, and at the outbreak of war those officers were called to the colours; many more volunteered subsequently either for special services or for the regular forces. In this way the staff was depleted of a considerable number of its skilled officers. At the same time the work of maintenance became of utmost importance, especially where military circuits were concerned, and consequently it was necessary to make arrangements for dealing with faults on certain circuits at any time of the day or night. Again, the rapid growth of the Army from its normal peace footing, the mobilisation of the Territorial forces and the activities of the Navy gave rise to demands for extensive re-arrangements and additions to the telegraph and telephone systems, demands which it was imperative in the national interests should be satisfied without delay. Fortunately the emergency legislation prevented some of those wayleave difficulties which are such a constant source of delay to construction works in times of peace, while others were overcome through the patriotism of the property owners who, generally speaking, did all that they possibly could to assist the Post Office. If we were at liberty to describe a few of the larger military works which have been undertaken by our Engineering colleagues during the past fourteen months and the periods in which they were carried out, there would be no room for doubt that the Engineering staff has performed abundance of good work in the minimum of time. Obviously this large increase of activity for the Government could not have been, or continue to be, carried out satisfactorily by a depleted staff, however willing, unless some reduction of work had been possible in other directions. Such reduction was possible and was effected by ceasing to canvass actively for new telephone business and stopping, wherever economically practicable, all works of construction in connexion with the telephone system. Still a large number of applications for new installations were received, and, as a tentative measure, it was decided to refuse all orders which were not for installations directly or indirectly needed in connexion with military movements or the provision of munitions

of war. This refusal to provide new lines has however been found to involve considerable hardship and inconvenience, not only to would-be subscribers, but also to many existing subscribers who found that the arrested development of the telephone service had corresponding effects on their business.

There are other aspects of the situation which chiefly concern the financial position. The normal term of an agreement for an exchange line is one year. Though the yearly lease has materially assisted in the popularisation of the telephone, in many cases the annual rental, unless paid over a period of years, does not nearly approximate to the irrecoverable cost incurred by the administration in providing the service; much less does it cover the capital charges and working expenses. To all telephone systems there is always a certain influx of new subscribers, of doubtful solvency or having no real need for a telephone service, who give it up after paying one year's rental, and in ordinary circumstances the loss on these contracts is necessarily one of the costs of the business which must be borne by the general body of subscribers. Under present economic conditions however it is not right or proper that the funds of the State should be wasted in providing facilities which are required to satisfy a moment's whim or to bestow a false appearance of prosperity on an unsubstantial business. On the other hand there are undoubtedly many professions and occupations whose functions are largely dependent on the telephone service, and which would be extinguished or seriously handicapped if such service were not obtainable. Not only is it necessary that the State should avoid waste in the present crisis; but it is equally important that the need for true thrift should be realised by every member of the community. By true thrift is implied the avoidance not only of deliberate waste of substance, in what is so generally described as playing ducks and drakes with one's money, but also of the thoughtless waste of substance in the purchase of articles which, though useful in themselves or in other surroundings, meet no real need of the purchaser, and the labour expended on which must therefore be regarded as unprofitable to the community. All enthusiastic Contract officers would deny as heterodox the theory that the provision of telephone facilities could ever come within the category of thoughtless waste; but it must on mature consideration be realised that the expenditure of capital by the State and the payment of rental by the individual for a telephone, which in his case is rather an ostentatious display than a necessity, cannot be justified in present circumstances. Much better would it be for the State to save its capital and the individual to invest his rental either in the war loan or some other work which would assist his brother countrymen in their present struggle against rampant militarism. How to bring this fact home to the individual except by appealing to his pocket for a lump sum payment is a serious problem!

Then there is the question of spare plant. Every telephone system carries a heavy burden in the capital charge on equipment which has been provided in advance in order to meet the growth of the system. Such spare plant cannot be wholly absorbed because, as soon as the margin is reduced below the normal, it is necessary at once to prepare schemes for providing additional plant, such schemes involving in some cases the selection and purchase of

suitable land, and in all cases either one or more of the following works, viz., the erection of a new building, the construction of switchboards and their installation after the building has been completed, and the manufacture and laying of cables. Obviously such works must in many cases be put in hand years before the spare equipment is exhausted; but they are in normal times carried out by contractors and Post Office staff whose main energies have now been diverted to the arts of war. Such schemes cannot therefore be carried out at present without serious effects on the necessities of the military forces of this country and its allies, and there is no alternative but to use the existing spare plant for national needs and for urgent cases only. In other words we want a process which will separate the wheat from the chaff.

The Post Office was therefore faced with the problem how to sift the many applications for telephone service so that it could provide facilities in those cases which it could satisfy without waste or extensive works of reconstruction, at a time when the staff was depleted and the funds available were strictly limited. Everything considered it was decided that a special surcharge of not less than £4 should be paid for each new exchange circuit, external extension circuit or private wire which was provided, and that, where the capital expenditure involved in its provision was more than the average, the surcharge should be increased by the difference between the average cost and the actual out of pocket expenses, excluding the value of any spare plant which might be utilised. This surcharge is payable before the work is put in hand and applies to the first year only. It is hoped by this arrangement to meet all demands of the military forces and all reasonable needs of the civil population. The Press have commented on these proposals not unfavourably and, so far as we can gather, the general opinion is that an extremely difficult situation has been met in a fair and reasonable manner. In any case the adoption of the surcharge is an honest endeavour to deal with the question in accordance with the principle that economy in private and public matters is as essential to the successful prosecution of the war as the raising and equipping of the combatant forces in the field.

INCREASE OF TELEPHONE TARIFF RATES.

To many telephone men, but perhaps not to all, it may seem superfluous to emphasise the fact that the proposed increases of charges to unlimited service subscribers are dictated by the financial situation, and that the new charges are not those which the Post Office would advocate in more peaceful times. The Post Office, in company with practically all telephone administrations, is convinced that the adoption of a universal measured service rate is the only proper solution of the question of telephone tariffs. The measured service rate was first adopted in this country as the only rate for provincial towns in May 1907, although before that date a limited number of message rate subscribers had been obtained in the provinces and a large number in London, where, however, an unlimited service rate was and is still current. In May 1907, therefore, the National Telephone Company—assisted rather by tacit acquiescence than by active co-operation on the part of the Post Office—undertook the missionary work of persuading sub-

scribers and the general public that telephone service which varied in quantity according to the requirements of the individual ought properly to be paid for by measure just like any other commodity or public service. This work progressed slowly at first, but aided by the limit of traffic for each line and the consequent improved service, it may now fairly be said that the principle of measured telephone service is practically accepted throughout the country. Indeed, the only dissentient voices at present are those of interested parties, such as subscribers who are obtaining an unlimited local service at less than their neighbours and in many cases at less than the cost to the Post Office. Under present conditions, those who are interested in telephone traffic problems would have welcomed the abolition of the unlimited service rate rather than an increase of the subscription for such service, because they realise the fact that those unlimited service lines which are shamefully overloaded increase enormously the difficulties and expense of giving a good telephone service to other subscribers. But obviously the present time is not opportune for abolishing the unlimited service rate in consequence of the extra labour involved, not only in providing more exchange and line equipment and more operators, but also in taking a record and bringing to account each local call in cases where such records have previously been dispensed with.

In the circumstances we accept the less of two evils, with the pious hope that the increased subscriptions for unlimited service will lead to many transfers to the measured service rates, and thus lighten our labours in connexion with the adoption of a general measured service rate at some future date when the problems of peace can be properly dealt with.

TELEPHONISTS AND ZEPPELINS.

WE make no apology for dilating once more on the conduct of the telephonists under that peculiarly mean and futile species of warfare, the attacking by night of unfortified places by bombs from aircraft. The story is the same all through; its variations are slight, but it is always splendid. Whether newest Germany shells seaside resorts under cover of a fog, or drops bombs on unfortified towns under cover of the darkness, the behaviour of the operating staff is always the same. Those who are at their posts stick to them, and large numbers of those who are not on duty voluntarily make their way to the exchange in case they may be wanted. In the recent Zeppelin raid on the London district, no less than 436 telephonists reported for duty at their own or the nearest exchange; and 120 volunteered their services by telephone, but were not needed—a total of 556 in all. These figures are so eloquent that they need no comment. When we remember that the raid occurred at an hour when most young ladies are safely in bed, and that therefore their zeal for duty involved getting up and dressing again, and in many cases running considerable risk from the falling missiles, which however ludicrously innocuous from a military point of view are not without danger to the lives of civilians, we cannot but feel extremely proud of these brave girls, these worthy sisters and sweethearts of our men under arms.

EDITORIAL CRITICISM.

WE print in another column a letter from Mr. McGrath protesting against editorial intervention in the correspondence on the subject of "Contract Department Methods." We are not sure whether it is the matter or the manner to which Mr. McGrath chiefly objects, as he seems to suggest that if we had expressed our opinion in the editorial column instead of in a footnote to Mr. Brown's letter it would have been less censurable. While we agree with him that an editorial expression of opinion is not necessarily the final word on any given subject, we do not agree that it is outside our province to sum up arguments and to give our verdict, or, as we should prefer to put it, to direct the jury—viz., our readers. After all they will give the verdict. We take this opportunity of saying that it is far from our wish to stifle correspondence. On the contrary we wish to encourage to the fullest the exchange of ideas on all subjects. There is, however, a limit to the length to which in the general interest a correspondence should run.

HIC ET UBIQUE.

WE propose in our next issue to begin a series of articles dealing with the history and development of the Telephone Service in some of our larger cities. The first city of the series will be Birmingham, and the article will be from the pen of Mr. A. E. Cotterell, well known both as District Manager at Birmingham and later as the Assistant Superintendent for the Midland Counties in the days of the National Telephone Company.

THE following letter is a copy of a strange communication received from a subscriber who was pressed to pay an account. It may fairly be regarded as a puzzle, whether as a study of temperament or orthography:—

Mister District Manger,

What is the mater with you Heavent you got no other job to occupy your time in stead of pisten me for half Crown iv got hundreds own me & cant get them you are Like a Babey crying for Titey Bottle i will send you the 2/6 ore you nelecte some other duty

Telephone ———

Send receipt for 2/6.

WE heard recently that there is a growing habit amongst telephone operators of fixing the breastplate transmitter lower than it ought to be. It was hinted that the low-necked blouses were responsible for the practice. Be that as it may, the result of such mal-adjustment is that the head has to be inclined every time the operator speaks with consequent tiring of the neck muscles and possibly the creation of ugly rings round the throat. The tendency no doubt is not to incline the head sufficiently so that the sound waves pass over the mouthpiece or have some space to travel before reaching it.

IN this connexion it might be interesting to point out the reason why subscribers and others are asked to speak close to the mouthpiece. Experiments have shown that the distance from the transmitter affects the transmission efficiency to such an extent that each $\frac{1}{2}$ -inch up to 4 inches involves a loss of efficiency approximately equal to the introduction of an additional 4 miles of standard cable into the circuit. What this means may be better understood

if we say that 2 inches more space than is desirable between the mouth and the mouthpiece when speaking over a 400-lb. long-distance trunk circuit is equivalent to adding about 400 miles to the circuit. As this calculation assumes that the mouth is directly opposite the mouthpiece although too far away, it will be readily understood that the loss of efficiency is even greater when the mouth is not opposite the mouthpiece.

THE WATCHES OF THE NIGHT.

BY A SPECIAL CONSTABLE.

Truly, to appreciate the stillness of London by night no better opportunity could be found than that afforded by a vigil on the roof of the General Post Office. There is probably no other city in the world whose business to all appearances ceases entirely about the hour of eight. All the crowds which have thronged the streets during the working hours of the day are utterly dispersed by that time. The more wealthy and the pleasure seekers have gone westward, and the vast majority have reached their suburban homes. Motor 'buses are now few in number, vans have almost ceased to rumble, and one by one the lights in warehouse and office windows have gone out. When first we leave "the amenities of the rest-room" (so they are styled in the official notice) to patrol the roof, we are indulged for a short space in a magnificent display of searchlights, but as these die down the darkness is the more remarkable and the stillness more surprising. What becomes of all the trains which leave termini not far distant at frequent intervals? About once an hour an especially heavy train is heard snorting northward or south-eastward; occasionally the unmistakable bump-bump-bump of a stopping goods-train strikes the ear; but how do the hundreds of other trains catch the secret of noiselessness and steal forth on their journeys so silently?

Mounting some post of vantage, for the balustrade of the roof is so high that in the normal patrol we can see nothing but the sky, we get a glimpse of the city—not yet sleeping but giving no very active signs of wakefulness. It is a picturesque arrangement of black outlines, studded with occasional lights, with towers and steeples projected against a star-lit sky. Here a street lamp gleams in the darkness, and there a light in some high window is conspicuous by its loneliness. Midnight approaches, but nothing distinguishes it from the later hours of the watch save the chimes ringing from the surrounding steeples. Ere one has finished the twelve strokes another takes up the tale, and softened by distance the clangour of bells rises from the belfries of ancient churches dedicated to I know not what Olaves, Mildreds, Antholins and other saints whose worth is forgotten in a pagan age. For nearly a minute the different chimes last and then again reigns the same silence, and in the same darkness.

Seldom anything happens, although "signs of a certain liveliness" from hostile aircraft have once or twice exercised the vigilance of the special constables. Night after night we scan the firmament for signs and portents of Zeppelins with all the patience of an Uncle Toby looking for a speck in the eyes of Widow Wadman. Well can we say with Virgil "*Tardet arli convexa tueri*"; for we weary indeed of observing the vault of heaven. Having exercised the hose, perchance, and assured himself of the satisfactory condition of the fire and sand buckets there is nothing for the special constable to do but patrol, patrol, and patrol. Here are unexampled opportunities for the amateur astronomer. In that unruffled calm a new system of ethic might be evolved or the germ of an epic developed. It is rumoured that officers of the higher division pass their time in improvising Greek verse—or in discussing golf handicaps. But rumour was ever a lying jade.

Sometimes a brilliant flash is discerned along the horizon, sometimes nearer at hand. If we were diligent readers of the *Daily Mail*, *John Bull* or the *Globe* we might ascribe them to the work of malevolent Germans; but with our undeveloped imaginations we attribute them to the overhead electric railway

or even to summer lightning—a theory less magnificent but probably more accurate.

The spectacle of a summer day's dawn over London is one of the slight recompenses of the vigil. The shapes of the Alexandra Palace on the north and Shooters Hill on the south-east emerge from the darkness, and the hideous outline of the Crystal Palace cannot be missed. The sun glinting on its roof gives it, however, a transient and factitious beauty. The trees in the Postman's park are alive with singing birds and the City pigeons raise their unceasing clamour. By this the watch is over and even a camp bed seems luxurious.

In the rest-room the stillness which is so noticeable on the roof is modified. The noises from the streets are less subdued, and the rumbling of trains and mail vans appears to be more frequent. Once the tinkle of a piano and the distant sounds of a bacchanalian chorus were discernible on the roof, but downstairs the waves of truly British melody surged in through the open windows in full flood, and continued until past two o'clock. A fellow-constable suggested that they proceeded from Belgian refugees. Untenable theory! Only the race which could withstand the onslaughts of Mons and the Gallipoli Peninsula could have withstood five hours of those devastating sentimental and quasi-patriotic ballads. A man with a voice like a bull sang some 30 songs in succession. Seemingly he could not be torn from the piano. Most of these songs, one of which was repeated innumerable times, had a chorus, accompanied by harmonised voices and by falsettos like the howling of wolves. The display could be attributed with more plausibility to a party of medical students. One fell asleep with the unmistakable sensation that one was still in the heart of old England. The silent city had taken on a familiar, less mysterious air.

TELEGRAPH FINANCE.

It may be of interest at the present juncture to reprint from the official *Historical Summary* the paragraphs dealing with telegraph finance:

At no time has the revenue from the telegraph service been sufficient to pay the interest on the capital; and for the last twenty years the service has been carried on at a considerable loss. In the first place it is now believed that the terms of the purchase were unduly favourable to the Companies, and the revenue has throughout been detrimentally affected by the low tariff granted to the Press under the Act of 1868, entailing an annual loss of about £225,000, and by the privilege of sending free messages conferred on railway companies by the same Act. Even under the commutation arrangements about a million and a quarter such telegrams are sent yearly—a loss of about £50,000.

In spite of these drawbacks, from the time of the transfer until the introduction of the sixpenny tariff there was each year a balance of revenue over expenditure available towards meeting the interest on the stock created for the purchase of the telegraphs. In the first year this balance amounted to £261,925; and although salaries and wages rose between 1870 and 1875 from 39 per cent. to 52 per cent. of the revenue, the pay of the Companies' servants having been kept low in view of the transfer, and all capital expenses were charged to the working account after 1873, the balance had increased by 1881 to £325,433—within a thousand pounds of the interest due on the stock.

This state of affairs, however, was completely altered by the introduction of sixpenny telegrams, which involved an expenditure of £450,000, and by the Fawcett revision of wages in 1885, entailing a further annual charge estimated at £129,000. At about the same time too the competition of the telephone began to be felt, and the revenue failed to meet expenses during each of the five years 1884-8. The next three years showed a small balance on the right side, but the Raikes revision of wages in 1891 brought an increased charge of £87,000, and in 1892-3 the unremunerative coast-communication service for saving life at sea was started at the cost of the telegraph service. From 1892 onwards the balance sheet has regularly shown a deficit, which has been successively increased by the Tweedmouth (1897), Stanley (1905), and Parliamentary Committee (1908) revisions of wages, bringing respectively increased annual charges of £82,000, £95,000 and £210,000; by the Jubilee reforms estimated to cost £57,000 a year, but actually costing £92,000 within four years of their introduction; by the further reforms of 1906 involving a loss of £7,000, and by the continued extension of the underground system at a cost of £1,500 a mile. About two millions sterling has already been spent on this work.

The largest deficit hitherto recorded occurred in 1903-4, when it amounted to £957,782. In 1909-10 it was £858,314, or £1,130,005 including the interest on stock.

TELEGRAPHIC MEMORABILIA.

MANY and curious are the by-products of certain industries, as, for example, the well-known instance of aniline dyes and coal. Telegraphy and telephony too are not without their analogous ramifications, branching off into unexpected twists and turns, difficult, at first blush perhaps, to trace back to their real root and origin. Thus it is proposed by Mr. Alfred E. Ball to synchronise the clocks of any given town by radiographic waves. By means of the proposed arrangement each clock would, at a given time, automatically signal itself by a wireless "buzz" to a central controlling station where an operator would "listen in" in turn to the clocks under control, having first checked the standard clock by means of the wireless time signal from Paris.

The transmitting apparatus is a very simple affair, measuring about 18 inches square and operated by a 4-volt ignition accumulator.

The inventor, however, sees one drawback to the scheme. During a European conflict "wireless" is forbidden, and the clocks would have to run wild for "the period of the war"!

While experimentally investigating the microscopic movements of a telephone receiver diaphragm a professor at the Massachusetts Technological Institute incidentally discovered a practical means of standardising organ pipes much more closely than by ear. A reflected beam of light from a triangular mirror showed both the character and amplitude of motion somewhat on the principle of the Thomson galvanometer. Vibrations thus investigated were found to agree with theoretical formulæ already worked out, and on this basis of combined practice and theory fully efficient organ pipes may be built up.

A reminder recently arrived, anent the praise of Baudot duplex and its introduction into this country, to the effect that Baudot duplex was an actual fact in Russia some considerable time prior to its appearance here in this country. The reminder came, he it said, from the department which was itself responsible for the initiation of the system into the British administration, the German and finally the French. A peculiar phase in this development of Baudot duplex has been the fact that France, the home and birthplace of Baudot simplex working in some of its most ingenious and interesting developments, was apparently the most reluctant to admit the possibilities of the British and Russian developments of the system.

The novice is always with us, no matter what may be our vocation, and he—or she—invariably affords at least a portion of the humour of any self-respecting office. Such a one, evidently not too well versed in matters military, despite the war, supplied a new open space for London by writing "The Horse Gardens," instead of "The Horse Guards," as the office of origin of a khaki telegram, while the following conversation took place in connexion with Wheatstone working, to a station which would blush to be named!—

Station A was working to X and the latter was reading badly. X accordingly called in repeater.

Repeater: "Do you get these reversals from A? They pass me well."

Station X: "No. I get nothing."

Repeater: "Have a look round. How's the galvo look?"

Station X: "I tell you I get nothing. The needle only trembles a bit, and there's nothing but a lot of dots on my slip!"

The repeater clerk's lot is not a happy one. Particularly is this so, or rather *was* this so, in the piping times of peace when our coastal repeater offices had to act as buffer states between the conflicting assertions of his own countrymen and those of "the others"! Never perhaps is the position an enviable one. It is not one of those intermediary positions where the intermediary takes fees from both sides and the estate pays, but rather that of the peace-making arbitrator between quarelling man and wife! This view must surely have been that of the anonymous writer

of the following quatrain which has blown in through the office window:—

"If at first you cannot read,
Try it at a slower speed;
And if then the marks are bad,
Swear the relay clerk is mad."

Not from a novice, but from a sleepy hollow where the one recent excitement has evidently proved to be the National Registration Act, comes the simple artless reply to an official query as to whether the receiver of a certain telegram was registered or not: "BQ. Yes, addressee is registered but he has not had his card yet!"

"It may be contended that many telegrams are of a technical and unintelligible character, but after all the large proportion of telegrams are comparatively simple." Thus, R. G. D. in an article on "The Transmission of Telegrams by Telephone" in the August number of the TELEGRAPH AND TELEPHONE JOURNAL.

"Comparatively simple" appears to be a sufficiently elastic term for polemical purposes but not sufficiently clinching to carry full conviction, or to act as a lever for ousting an old and tried system which, notwithstanding its age, is yet sufficiently virile to beget its own children and to carry on its own work successfully. On the contrary only a small number of *commercial* and business telegrams could be classed as easy of correct transmission by telephone. It is one thing to utilise the telephone with expert well-paid stenographer telephonists or typist telephonists at each end, as is done in the case of certain long distance telephony by Press Agencies and others, and quite another to convey phonograms containing foreign texts, business, technical terms and financial quotations by the aid of that class of telephonist which the output of any main trunk line would justify.

So far as the telegraph side is concerned the challenge is accepted. "Specially trained telephonists" and "the best lines available" are suggested as the first conditions, says the pro-telephonist. "Good!" exclaims the pro-telegraphist.

Take then, for example, the best Glasgow or Birmingham loop with whatever standard of audition the telephonist may choose to lay down. Let it be worked as a phonogram circuit by a picked telephonist staff selected from any part of the United Kingdom for their clearness of enunciation and general smartness. Let the trial be continued for six days of twelve hours per day. Let stenographer—telephonists or typist—telephonists be utilised with as many weeks' training in handling telegraph traffic as may be necessary. Also give the telephonists every opportunity for relief whenever they show signs of fatigue.

Now give the pro-telegraphist the choice of a dozen learners in the Telegraph School (male or female or half and half), let them have, not more than two months' Baudot training of two hours per day, and it would be strange indeed if the telegraph output were not to exceed the telephone output of the same pair of wires by five or six times, each day and *all the time*. Add a month's actual work to the experience of these "learners" and it would not be surprising if the result were increased still further by 15 per cent. to 20 per cent.

If it be argued that the cost of the telegraph staff and also the prime cost of the telegraph apparatus would prove very much greater than of the telephone, the obvious reply is that the increased output of the circuit would be more than justified by any extra expenditure under the two above headings. It is well understood that the life of Baudot, Murray and Creed, for example, is likely to prove of much greater length than experts at one time considered to be possible for high-speed telegraph apparatus, that is if initially well built and the proverbial "aporth of tar" be not spared. Provided ordinary care be exercised and daily maintenance be not too vigorously economised fifteen to twenty years should be somewhere about the average life of the three types of apparatus above mentioned.

This apparently side issue apart in all friendliness, there is the gauntlet!

By a happy coincidence and by the courtesy of one of the officers of a British Government cable coast station it is possible

W I T H B E S T W I S H E S A N D
T H A N K S

EXAMPLE OF SIPHON RECORDER SIGNALS.

to supplement the article reprinted from the *Telegraph and Telephone Age*, on "How American 'Notes' are sent to Germany," by a specimen of the signals used on long submarine cables and which are graphically described by the writer of that article in the following words:—"When a 'dot' arrives the siphon draws a little hump above the line while if a 'dash' is sent the hump is below."

In the above example of siphon recorder signals care has been taken to obtain the same under conditions devoid of any electrical distortion. In cases when, owing to pressure and other causes, distortion is actively present, more than usual skill and experience are required to accurately read off these delicate pulsations.

Coincident with the memorable sitting of the Trades Union Congress, and the special reference to the alleged pressure by certain workmen upon Belgian munition workers who had shown abnormal outputs, comes the unpleasant rumour that similar if more subtle pressure has during these last few months been brought to bear upon Belgian telegraphists now temporarily in the employment of the British Government Service. It is difficult to believe that anyone so closely in touch with the serious side of the war, as are doubtless telegraphists, should lend himself to an act so deliberately base.

So splendid has been the record of telegraphist loyalty and devotion that one wonders how the rumour originated.

J. J. T.

S. F. B. MORSE AND THE TELEGRAPH.

THE EVOLUTION OF A GREAT IDEA AND THE PATIENT ENDEAVOUR BY WHICH IT BECAME A PRACTICAL ACHIEVEMENT.

(Abridged from an article by FRANK JEWETT MATHER, JUN., in the *Nation*, New York).

WHEN Samuel F. B. Morse conceived the idea of the electric telegraph in 1832 he renounced a distinguished past. . . . The great idea came to him quite casually when returning to New York on the packet *Sully* in October, 1832. In the cabin one night the talk was of the new electrical discoveries. Dr. C. T. Jackson, of Boston, described the possibility of noting the current simultaneously at any part of a long circuit. Morse remarked: "If the presence of electricity can be made visible in any part of the circuit, I can see no reason why intelligence may not be transmitted instantaneously by electricity."

Unknown to Morse, others were working at the same problem, notably Wheatstone, in England, and Steinheil, in Germany. Military and marine signalling already used the principle of the alphabet. Morse's merit was to conceive once for all the apparatus by which electrical telegraphy became practical. As he himself sensibly insisted during the unhappy controversies which accompanied the perfecting of the invention, the telegraph was not an idea but a machine. The essentials of the machine he worked out before the *Sully* reached Sandy Hook.

In view of subsequent controversies about the invention, it is unfortunate that the original note book which Morse used on the *Sully* has disappeared. Yet there is no reason to distrust the copy which he made himself of the essential sheets. From the facsimiles in the new official biography it is clear that Morse at once grasped the notion of the recording key. There is a sketch of a balanced lever with a stylus which bears on a moving strip of paper served from rolls. When the lever is held by the powerful magnet in the magnetic circle, the stylus scores the paper; when the circuit is broken a weak local magnet raises the lever with its stylus from the paper. In other words, when the electric circuit was closed a continuous line was made on the paper, and this line, by breaking the circuit for longer or shorter intervals,

might be traced in dots and in dashes of any desired length. By breaking and closing the circuit at any point the same dots and dashes would be recorded by any number of such keys. Mechanically and scientifically the apparatus was right from that moment in October, 1832, when Morse casually scrawled on pages 25, 26 and 29 of his pocket note book. The perfecting of the invention concerned chiefly working the dots and dashes into the most convenient sort of code, and assuring circuits of sufficient power, length and permanency. In all these later developments we enter a highly controversial field with confusing claims and counter-claims. So we do well to remember that from the first flash of invention in Morse's mind there has been no radical change in the telegraph as an apparatus, merely refinements on Morse's principle, no change in the visible units by which the communication is made. Two of the most essential improvements have been claimed for his later partner, Alfred Vail, the alphabetical code and the relay which permits indefinite lengthening of the circuit. This matter we must consider briefly in its turn.

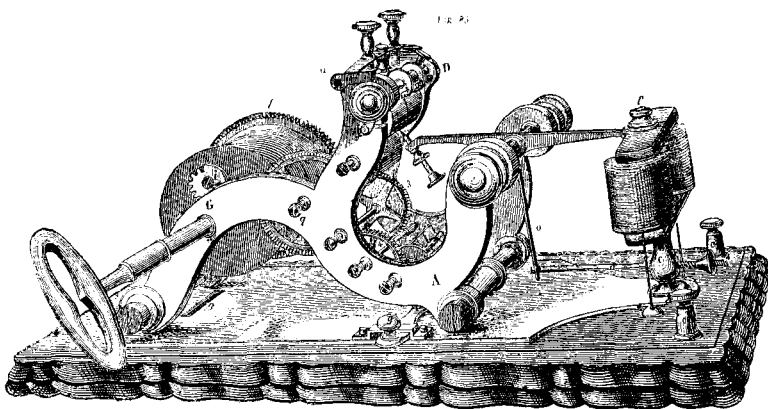
But before opening so contentious a chapter, one would willingly dwell on that flash of vision by which a difficult problem is once for all solved, a revolution effected in the turn of an eye. Of course no such thing comes literally out of the blue. Morse had long had an intelligent interest in the new discoveries in electricity. At Yale, he writes with enthusiasm about Professor Day's experiment in the *Philosophical Chamber*, and Professor Dwight's lectures. Later, in New York, he heard Professor J. M. Dana in public lectures and demonstrations. He had never heard of Joseph Henry's researches at Princeton, which might greatly have shortened his labours and prevented the most infelicitous of his many controversies. Yet the smattering of electrical lore which he gained was enough. Men of his sort build on the broadest general principles which ordinarily they assume. Their business is with application. Their task is not that of science, but of super-mechanics. Morse himself was wholly conscious of his role when he insisted that the telegraph was a machine. He was large-minded enough to distinguish between those who create and enlarge science and those who set it to work. It is a distinction that needs to be repeated and emphasised in an age that tends to confuse the Morses and Edisons with the Faradays and Kelvins.

Fenimore Cooper, with other friends of Morse's, always insisted that before the memorable voyage of the *Sully* he had talked about and studied telegraphy in France. Morse himself had no recollections of the alleged conversations and studies, but was unwilling to question the memories of his friends. . . . As soon as Morse landed in New York, he began to work at his model; but there were many threads to take up, and it was not until 1835 that he fully committed himself to the new venture. His decision was precipitated by the shipwreck of his artistic ambitions. Congress had voted funds for four mural paintings to complete the decoration of the Capitol at Washington. Morse, as president of the National Academy, had the best prospects of getting one of the panels. President John Quincy Adams however, distrustful of American talent, entered a resolution opening the competition to foreigners. This action was sharply criticised in a letter in the *Evening Post*, which was generally attributed to Morse. It was, in fact, the well-intentioned championship of his friend, Fenimore Cooper, which had put him out of the running. From this chagrin Morse never recovered. He came to regret his devotion to painting. It was much more than the loss of a promising commission, it was the dashing of the hopes of a lifetime to excel in the historical and monumental style. He burned his bridges, but with prudence, gradually withdrawing from portraiture as other support offered, and resigning as soon as he honourably could the presidency of the Academy. Immediately he accepted a professorship of the literature of the arts of design in the University of New York, honourable drudgery which nearly afforded a livelihood. There, from 1835 on, in the now vanished building on Washington Square, he worked out the details of the great invention. At times his poverty was extreme. He lived frugally on the provisions which he brought into his studio after nightfall. As a great personage in New York he must conceal the narrowness of his life.

For several years he was on wrong tracks. He experimented with a dictionary code, the signals representing entire words and phrases. His feeling was still that the telegraph would be used only for important and secret business. But, as early as the note book of 1832, he had seen that the letter code must sometimes be used, as in proper names. For a long time, too, he made the signals by notched types which mechanically broke the current. Eventually this plan was abandoned for freehand manipulation of the key. For the key itself, after experiment with a pendulum form, he returned to the simple apparatus sketched in the memorable note book. Before the year 1835 had closed, he had, unaided, carried the machine to the point where

he could transmit messages through about 40 feet of wire. It seems that he independently discovered the principle of the relay, but the difficulty persisted of obtaining current enough to record a message through a single circuit of more than 40 feet. At this point a new colleague, Professor Leonard D. Gale, came to the rescue. He was conversant with the recent discoveries of Joseph Henry. Once multicellular batteries and more powerful magnets were installed, it was easy to transmit messages over ten miles of wire.

In the late summer and autumn of 1837 Morse gave a number of demonstrations with a circuit 1,700 feet long. On Sept 2 there was present, among greater notables, Alfred Vail, a young alumnus of the University. His family owned the Speedwell Iron Works at Morristown, N.J., were prosperous and influential. He offered himself as Morse's ally, agreeing to finance the experimental stages of the invention and to make the working models. Vail's mechanical cleverness was much superior to Morse's, and while any attempt to allot credit for the machine that finally was patented seems impossible, it is to be presumed that Vail's influence may be traced in the gradual simplification of the apparatus. It should be noticed, however, that such simplifications are invariably only so many returns to the sketch-book of 1832. The probability is, then, that at a time when Morse may have been somewhat confused by the many alternatives presented from his own teeming mind, Vail, reviewing the whole course of experimentation with greater coolness and detachment, aided substantially in the choice of the better possibilities. There is no question that he brought a great access of strength and encouragement to Morse at a critical time. It is not easy to exaggerate the moral support he brought to his partner. He was loyal under trying circumstances.



THE FIRST STANDARDISED MORSE INSTRUMENT.

It is not unnatural that local patriotism and the piety of descendants have created a Vail legend which credits to him the invention of the alphabetical code and the local circuit. It should be said, however, that he never personally claimed either invention, and that the evidence seems conclusive that Morse had solved both problems before he met Vail in 1837. The claims for Vail, which have produced a considerable controversial literature, seem to the reviewer based on a misconception entirely honest but untenable. The machines which Vail unquestionably made are regarded as marking the discovery of the principles under which they were operated. The wording of his diaries often lends colour to such a misinterpretation, quite innocently, for, of course, he was adventuring in a field new to him. As a matter of simple justice, however, one must insist that Vail's aid was chiefly moral and financial. Nothing that he contributed to the machine patented in 1837 was as indispensable as that counsel of Professor Gale, by which the telegraph was at once changed from an ingenious scientific toy, communicating across a room, to a practical means of communication across great spaces. And the candor with which Morse acknowledged the aid of Gale gives no colour to any supposition that he consciously minimised any contribution that other associates may have made. It is well to recall that the three original partners always remained friends, and that in their lifetime there were no conflicting claims of any sort.

On Jan. 22 Morse gave a private demonstration to many New York notables through ten miles of wire strung in his lecture-room. One of the spectators indited the bombastic yet not wholly inappropriate message: "Attention, the Universe, by kingdoms right wheel." The experiment was the occasion of intelligent and enthusiastic comment by the Press, and the way of the inventor should have been thenceforth easy. As a matter of fact it was five years before the Government sustained the project in the experimental line of 1843 between Washington and Baltimore. Meanwhile Morse was harried by the insane claims of Dr. Jackson and by the treachery of later business associates, by the unfair and arbitrary denial of a patent in England, by the unexpected failure of a great contract with Russia. The general reception before the French Academy of Science in 1839, where Arago explained the invention and Guy-Lussac and Alexander von Humboldt

commended it, is one of the few bright spots in these years. But the French Government was as slow to move as the French *savants* had been quick. Morse returned disappointed to New York, where in 1840 he was within sight of death from starvation. Yet he won through, and after infinite difficulties, largely overcome through the zeal and patience of Alfred Vail, the wires were stretched from Baltimore to Washington. The test message which Morse sent from Washington to Vail at Baltimore was "What hath God wrought." Vail returned it correctly to the sender. Before that momentous experiment, the telegraph had sensationally proved its effectiveness by picking up from a train the news of Frelinghuysen's nomination as vice-president and getting it to Washington a full hour before the train's arrival. Soon the doubters in Congress and the business world were on Morse's side. At 53 he had gained a new fame, this time world-wide. After eight years of poverty fortune was assured.

CORRESPONDENCE.

EDITORIAL CRITICISM.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

"Reserve thy judgment," says Polonius. This healthy maxim was apparently not in the mind of the Editor when he penned his comments on Mr. J. R. Brown's letter in the September issue on "Contract Department Methods."

I do not desire (even were I permitted) to re-open the discussion on that subject, nor to pretend to enter the lists on behalf of Mr. Brown, who is more than capable of guarding himself; but I am moved to a mild protest against the Editor's belated intervention. In a matter of controversy on a subject of general interest, one conceives the editorial function to be to keep the ring clear and to afford equal facilities to all the controversialists. An attack on the journal in which the discussion is being carried on, or on any question regarding its policy, may be and generally is replied to in the form of a comment on the letter carrying such an attack; but an expression of editorial opinion in a general discussion ought surely to be reserved for the leader columns. In such a matter the Editor's judgment is not necessarily final; it is not his task to sum up the arguments for and against and to pronounce the verdict.

Is it "cricket" to print Mr. Brown's letter "with some misgiving" and then to express an emphatic verdict against his contentions, while closing the columns of the JOURNAL against any further reply by him? Whether or not he is right in his views, he ought not to be exposed to an unexpected attack from one whom he will naturally have regarded as a neutral, and against whom he has not armed himself. The Editor's arguments are doubtless of weight, and, as an individual contribution to the discussion, entitled to respect; but the fashion in which they are expressed and their appearance at the very end of the controversy rather resemble the conduct of a referee of a boxing match who, having declared the contest at an end, nevertheless delivers a good hard hit at one of the combatants and then awards the verdict to the other.

J. L. McGRATH.

Edinburgh, Sept. 10, 1915.

THE STAFF AND TECHNICAL CLASSES.

IN view of the approach of the autumn session it will probably interest many of our readers to know that, subject to certain conditions, the Post Office undertakes the refundment of fees to members of the staff who obtain technical certificates. Refundment is granted to officers attending recognised technical institutes who obtain first class, second class or pass certificates in any stage of the following subjects:—

- (a) Telegraphy—City and Guilds of London Institute.
- (b) Telephony—do.
- (c) Electrical engineering—do.
- (d) Electricity and magnetism—Board of Education or City and Guilds of London Institute.

Any officer whose pay does not exceed £160 a year in the provinces or £175 a year in London is eligible to have his fees refunded, provided that he is employed in a department where technical knowledge is of value. The amount refunded does not in any case exceed 10s. per subject. Officers eligible to receive a technical allowance do not come within the scope of the arrangement.

It may be mentioned that recognised technical institutes which do not already provide suitable courses of study are generally willing to arrange special classes in the subjects mentioned if a sufficient number of the staff offer to attend.

PHANTOM CIRCUITS.

BY JOHN GAITER (*Aberdeen*).

PHANTOM circuits—a term which conjures up visions of the uncanny—have bulked largely in the minds of the peoples of certain northern cities for some years, and it has proved difficult to convince the hard-headed sons of the North that circuits so fancifully named could possibly be a useful substitute for such a tangible thing as an underground cable. But these circuits have already proved their worth and may be said now to be out of the stage of experiment and speculation.

What is a "phantom" circuit? Simply an arrangement of electrical apparatus by which a telephone circuit can be made to carry telegraph signals at the same time as telephonic conversation without the value of either being impaired. The outlet thus provided for the telegraph signals is known as a phantom circuit. As the telegraph apparatus is practically "superposed" on the telephone lines the telegraph circuits so obtained are also known as "superposed circuits." Various methods of carrying out this arrangement are in use, but for emergency purposes a standard form of apparatus is provided by which the phantom circuits can be brought into existence easily and quickly to take the place of faulty telegraph lines or to provide extra channels for telegraph traffic.

In Aberdeen the provision of such circuits is of almost daily occurrence. They are used to take the place of telegraph lines on which faults have developed and to provide extra outlets for traffic connected with political speeches or other events of great public interest. As many as half a dozen superposed circuits have been arranged on one day between Aberdeen and other offices in Scotland for such purposes and have filled the part admirably.

The working of superposed circuits is not confined to one method. They have been used with simplex and duplex apparatus for key working, and for fast Wheatstone use, and even quadruplex has been tried upon them.

Simplex key working presents no difficulty. A circuit for this method can be called into existence and brought into working condition in a minute or two. Fast speed simplex working requires a little more care, but is quite practicable. Under favourable conditions a speed of 150 words per minute has been obtained, and even at this rate of working the disturbance on the telephone circuit has been found to be negligible.

It rather upsets one's preconceived ideas when such a result is obtained. The general understanding is that the retarding coils and condensers introduced between the telegraph apparatus and the telephone lines are for the purpose of slowing down the rise and fall of the current so as not to cause noise in the telephones.

Yet here we have an example of working which demands a rapid rise and fall of current and the effect on the telephone circuit is insignificant.

In fast speed working and indeed in all methods of working with these superposed circuits it has been found desirable to use voltages of as small a value as possible. As an example of this it may be mentioned that on one occasion a circuit was arranged for Wheatstone working from Inverness to Dundee by means of an Aberdeen—Inverness telegraph line extended at Aberdeen to Dundee by means of a superposed circuit. With a voltage of 120 a speed of only 55 words per minute could be obtained but when the voltage was reduced to 40 the speed was at once raised to 90 words per minute. Such a result is probably due to a lessening of the electro-motive-force of self-induction in the retardation coils with the lessened voltage, but technical readers can reason it out for themselves.

Duplex working both key and fast speed is usually not so easily arranged, especially on lines over a hundred miles long. The difficulty is to get a good balance. The signals will split, regulate as one may, and it would appear that the balancing apparatus in the compensation circuit does not allow so fine an adjustment as such a circuit requires.

In trying to obtain good results leak circuits with small

condenser values have been fitted in the line circuit at Aberdeen and a non-inductive resistance of about 1,000 ohms has been introduced at each end of the line, and these additions have been found to be a great help in balancing.

Fast speed duplex working requires a good balance and care in regulating, but speeds of 90 words per minute have been obtained, although 40 to 50 words per minute is the more usual experience.

Quadruplex working on a superposed circuit has been tried but at no time has full quadruplex been successful. Duplex on the "A" side and up and down working on the "B" side has been worked fairly well, but for emergency purposes quadruplex may be ruled out of court as it takes too long a time to regulate for such a method of working.

And now it may be asked will these phantom circuits be available when most required—when storms ravage the country side and play havoc with telegraph lines? It is a comfort to know that the latest type of telephone trunk lines are exceptionally well poled and strongly built, and that routes selected for them are along sheltered lanes and byeways. So that I think we have reasons for looking at the matter from an optimistic point of view and answering the question with a hopeful "Yes."

A FEW GLIMPSES OF POSTAL WORK.*

BY W. W. YOUNG (*Birkenhead*).

I MUST express my gratitude to you for the invitation to write this paper, because the writing of it has increased my own interest in the penny postage stamp and its important work, as well as in its romance. For, when you come to think about it, there is a great deal of the romance of life associated with the little penny postage stamp. This simple red label is a little winged flying machine which daily conveys the more or less personal messages of millions of mortals to each other to almost every part of the earth. It is the symbol of an undertaking by the State to convey whatever thoughts any individual may wish to transmit, provided those thoughts can be put into writing. It does not matter what those thoughts may be—our joys, our hopes, our fears, our sorrows are all the same to the postage stamp. Once you have sealed these feelings inside an envelope, upon which you have put the necessary stamp, and dropped the cover into the red box—the little red passport carries those treasured messages right to the very threshold of your distant friend; the penny postage stamp has carried you—the spirit of you—right to the presence of your correspondent. So that we may quite truthfully say that the primary function of the Post Office is to carry our thoughts to and from our friends (and, I suppose, also to carry messages to and from people who are not our friends—tailors and dressmakers, landlords and other disagreeable folk), who worry us with their unnecessary thoughts about things.

Of course, as you know, Postal work is not confined to the delivery of letters and parcels, but the first object of this paper will be to try to give you some general idea of the machinery by which the letter you drop into the open mouth of the red letter box is transferred from one hand to another, then whirled away through space over the railway lines, until the postman puts it into the letter box at your friend's house, a few hundred miles away. Although the delivery of a letter seems a simple operation in itself, the organisation now necessary to effect it is a vast and very complicated one, and is the gradual growth of long years of experience, every increase in the number of letters posted calling for additional machinery, more detailed and more complex than its forerunner.

The machinery of the Post Office, so far as the distribution of your letter is concerned, does not consist of very much steel mechanism. From the time you are served with your penny postage stamp by the more or less sweet young lady behind the Post Office counter, to the time the occasionally cheerful postman meets your correspondent on his doorstep, the distributing organism is composed almost entirely of quite everyday ordinary human beings. The human element in Postal machinery is thus predominant, and is, of course, of immense importance. So it seems to me that if I try to explain the work of some of the people engaged in sending your letter along on its journey, you may get a better notion of the organisation of a sorting office than if I attempt a too technical description of systems. And after all, though some descriptions of systems may be very interesting, there is nothing so interesting as ordinary live men and women and the things they do. Moreover, the audience is not a Postal one, and you have a right not to be bored too much with technical details, though I warn you, you will have to put up with some.

Now, you've dropped your letter into the red box, and the postman comes along. He opens the door—takes the time tablet out—puts in another to show the time of the next collection, and takes your letter in his bag with a thousand or so others. He may repeat the operations at four, five, six or eight boxes; then off he rides post haste to the Head Office. There is an

* A paper—not intended to be too serious and technical—read to members of the Liverpool Telephone and Telegraph Society, Dec. 8, 1914.

assistant inspector of postmen waiting there for him. The postman is due at say 8.18 precisely, not 8.20, and if he is a few minutes late he is in danger of getting into trouble. He hands to the inspector the tablets he has taken from the boxes and the keys of the boxes. Each tablet represents a particular box. The inspector checks them off to see that your special letter box has not been overlooked. It would be rather annoying to you if your important letter were left out in the cold all night. So the postmen very, very rarely overlook a letter box. If they do fail, the inspector at the office at once misses the tablet and the supervising machinery begins to work.

Postmen from all over the town pour in to the office—10, 20, 30, 40 of them. Tables are piled up high, 20, 30, 40, 50 thousand letters. Once the letters are emptied on to the opening table the process of *facing up* begins. That is; all letters of about the same size are placed so that all postage stamps are facing the same way. The postmen do this. This is to facilitate the obliteration of the postage stamps: sometimes done by an electric stamping machine, but at others by hand. When the stamping has been done, the letters are carried—a few hundreds at a time, the addresses all in good order—to the primary sorting desks. At a large office like Liverpool there may be any number of men up to 100 primarily sorting letters at one time. There are 30 divisions comprising this first sorting. The British Isles is divided into about 30 primary divisions at Liverpool, and all letters for London are put to the London road, those for North Wales to Chester, those for the West of England to Bristol and so on. When the primary sorting has been done, the letters are “boxed off.” That is, periodically, they are collected from the primary sorting fitting, and are taken to the particular despatch road. A despatch road is a desk-fitting with three or four tiers of shelves. These shelves are labelled with seven or eight labels in each row. Each of these labels represents a town or a travelling Post Office to which a mail is to be despatched.

The primary sorting, or a great deal of it, is usually done by postmen, but each despatch road is in charge of a sorting clerk and telegraphist, and he is responsible for correctly sorting your letter to its destination. The work of road sorting is frequently difficult and complicated, and the sorting clerk's memory needs to be very good if he is to do all his work correctly and quickly. It must not be supposed that even a large proportion of letters are addressed to big towns, and that road sorting is simply a matter of putting all letters for Bradford to the Bradford label, Leeds to the Leeds label and so on. A sorting clerk will in the course of an evening from 6 to 11.30 p.m. sort about 8,000 letters. Many of them, he will sort at the rate of 40 to 50 a minute, and many hundreds of them will be simply addressed to remote villages and places unknown except to the people directly concerned. As the letters sorted for any one of these labelled places become numerous, they are tied up into a bundle of any number between 50 and 200 and are then bagged off—that is, they are put into their proper mail bag, which is hanging up on a fitting usually behind the sorter.

Now considerable responsibility rests with this despatching clerk. If in the hurry or anxiety of the moment he mis-sorts your letter—your letter that really must be delivered first post in the morning—it may go to Darlington instead of to Newcastle and suffer some hours delay, or, as sometimes happens when he is excited, the despatching clerk may put a whole bundle of letters into a wrong bag.

Let us suppose your letter is already tied up in its bundle and is lying safely in the proper bag. The train to carry it away leaves promptly at 10.45 p.m. The time now is, say, 9.30 p.m. A hundred sorting clerks at a hundred desks are working at high speed sorting letters for all parts of the world. Every man is a quick-moving organism whose hand instantly darts towards the proper destination when his brain has given the decision as to which of the 30 or 40 divisions it is to be put. Tremendous issues sometimes lie in the movements of these hands and in the quick decisions of these heads. Heedless and unconscious of the contents, these men have been distributing the letters to their divisions all the evening. The despatch time is in sight, but the highest pressure is yet to come. It is beginning now—9.30. Mails from the local outlying districts are coming in piled up on trucks. Overseers with mail lists are checking and ticking off the names of inward mails that are called out by postmen. Sorting clerks at the opening tables stand by with specially designed scissors in hand; they first examine the seals of the bags to satisfy themselves that the bags have not been tampered with *en route*, then they cut the string round the neck of the bag, pour out the contents, 20, 30, 40, 50 bundles of letters, bearing brown labels “Midland Road,” “London Forward,” “Irish A,” “Bristol Road,” and so on. These letters have already been primarily sorted at the sub or other offices in the town. Other clerks grab the bundles, sort all those bundles for the same road into big pigeon holes, another clerk comes along and takes all the Midland road bundles to the Midland road 10, 20, 50 yards away, cuts the string, lays the letters out in straight long rows on the front of the desks before the despatching officer for sorting, goes back to the big pigeon hole rack to feed other roads in a similar way. A supervising officer stands by watching, and directing so as to keep the flow of work in the proper channels and seeing that every bit of machinery is working, and working well.

Quarter to ten! Maybe the clerk is fairly new to his road. On one side he has twenty or so letters which he cannot sort—the addresses are all strange to him though they are all for his road. He has a circulation list of places above his head with six or eight hundred names on it, showing the circulation of letters in his section of the map at different times of the day and on Saturdays and Sundays. The places written on these twenty letters are not given in his list. He must find out the proper delivery for each one. They must not be left behind. As fast as he lessens the long row of letters in front, the feeder or box-off comes with hands full, sometimes arms full. Ten o'clock. The mail of 30 bags from this road must be ready by 10.20. It

will take him a few minutes to look up his blind letters. “Blind letters” are those twenty which he cannot sort. It will take him ten minutes to sort the long row in front of him and to tie up the bundles and bag them off. The overseer in charge of the section comes along. He is responsible for seeing all letters are sent on from the road. He is an old despatching officer—he knows every village and hamlet on the road. He gives the despatching officer a hand and within two minutes every blind letter is sorted. The sorting clerk's eyes are on the clock, his speed in sorting increases, and at 10.10 he is clear of letters to sort. But he has now to get bills and registered letters and to close all his mails. Off he darts to the Registered Letter Office counter.

With every letter despatch a letter bill is sent, and on this bill is advised certain particulars of registered letters sent in the mail. These registered letters before they reach our despatching officer are dealt with in a separate enclosed apartment, by several clerks. A few minutes before the letter despatch, each despatching officer goes to this registered letter counter to obtain all the registered letters for his part of the country. Every registered letter or registered letter bag must be signed for before it is passed over to him. The scene around a registered letter counter at despatch time is frequently electric in character.

Our special despatching officer calls out for his particular road bills. The clerk concerned inside hands out to him 25-letter bills, say twenty registered letters for different towns and five registered sealed bags already containing registered letters. Our man checks them; sees that he doesn't sign for any he has not got, and that he has got all he has signed for; flies back again to his road laden with his green registered letter bags. 10.15! Thirty bundles of letters to tie up, 25 bills to tie round the bundles and to drop them into the proper bag along with the registered letters. As the clerk drops the last part of the mail into the bag he calls out “tie up down special T.P.O. bag.” Two or three postmen are standing by ready, and within a few minutes the whole of the 30 bags are ready for sacking off.

Sacking off is a system devised for convenience in the transfer of mails at railway stations and also for economising the cost of railway carriage.

Those 30 mail bags will be divided into, say, five different sacks. Down special sack, Newcastle sack, Midland T.P.O., going North sack, and so on, and our despatching officer is personally responsible for the sealed bags being put into the right sack. To put a bag into a wrong sack would perhaps mean sometimes several hours delay to the whole of the mail in the bag. Each bag is called out and ticked off on a sheet as it is sacked off, the despatching officer being responsible for the proper tying and sealing of the bag. All mails used to be sealed with wax, but now lead seals are used. The sacking-off over, the mails are put on to trucks and in a few minutes are being hurried along in the big red van to Lime Street Station. Your letter is safely on its way to its destination, and our bit of human machinery is by this time calmly smoking a cigarette, waiting at the corner of Whitechapel for a car to take him home to the bosom of his sleeping family.

Now that, in a rough sort of way, is what the Post Office has done with your letter, at the office of despatch.

Let us have a wider glimpse at the sorting office whilst the mail is being taken to the station.

What strikes one most about a large sorting office, say an hour before despatch time, is the very rapid movement of the whole machinery. It is quite a bee hive! Numerous men are darting here and there and in and out amongst the fittings, carrying boxes of primarily sorted letters to the proper despatch roads, others are picking up a specified handful of letters from one desk here and laying them down on another particular desk there—the latter are gathering up mis-sorted letters to be re-sorted by an expert sorter. Every man is doing his allotted task (every item of the work is of course arranged beforehand). No man is idle; not one is dawdling, and every one in some way or other is assisting in passing along your letter to a certain point.

Although all this speedy passing and repassing by the men, all these rapid hand movements of the sorting officers, and the many hasty glances at the clock, suggest that every man is having a strenuous time, the whole mass machine moves along according to very precise laws and principles, which govern almost every movement of every part, the ultimate and only object of which is that your little letter, the little bundle of personal messages, shall be safely sent on its journey. Indeed the whole system is very like a huge clockwork arrangement which gets specially wound up an hour or two before the despatch of the night mail. The public are allowed the latest time for posting their letters, with the inevitable result that almost everybody takes advantage of it, and oceans of letters pour in to the sorting office just in time to be got ready for the outward mail: just in time for the mass to be separated, letter by letter, until all those for the same destination lie snugly together in bundles waiting for the next stage in their journey.

Every despatch road is self-contained, distinct in geography from every other, and although every man performs the same hand operation, his vision has a separate bit of the world in front of him. One man sorts only letters for Japanese towns, this man for London districts, half a dozen for United States towns, that one sorts to South American towns, that to the travelling Railway Post Offices in Ireland—this to French towns, another to Australian towns, this one to South African places, besides 50 or 60 other men who have got the United Kingdom divided into 50 distinct sections, each again divided into 30, 40 or 50 separate mails.

All this dividing out into thousands of districts and divisions must be done not merely correctly but within a limited time. And thus, at the night mail despatch we have the great sorting office machine with its very elaborate detailed system, working with great rapidity and sometimes under much pressure just as in the Telephone and Telegraph Departments you have your special periods of tension.

Gell Telegraphic Appliances Syndicate, Limited.

ON WAR OFFICE, ADMIRALTY, POST OFFICE, CROWN
AGENTS, AND OTHER COLONIAL ADMINISTRATIONS
LISTS OF CONTRACTORS.

SOLE MANUFACTURERS OF THE

GELL KEYBOARD PERFORATOR.
GELL Motor - Driven Transmitter.
GELL Motor - Driven Receiver
for Morse and Cable Wheatstone working.

Also Manufacturers of

**LANDLINE, CABLE AND WIRELESS
TELEGRAPHIC APPARATUS.**

Registered Offices:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Sardinia House, Sardinia Street, Kingsway, W.C.
Telephone: Holborn 6826.

Works:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Pine Grove Works, Tollington Park, London, N.
Telephone: North 1196. Telegrams: "Gellias, London."

ESTABLISHED OVER 25 YEARS. HIGHEST AWARDS—12 GOLD MEDALS.

HARRY HALL

"THE" COAT & BREECHES SPECIALIST, LADIES' COSTUME & HABIT MAKER.
149, CHEAPSIDE, E.C. 207, OXFORD STREET, W.
(Near G.P.O.) (Near Oxford Circus.)

SERVICE DRESS

FOR IMMEDIATE WEAR or to
ORDER IN 24 HOURS.

ACCURACY AND FIT GUARANTEED

Field Service JACKET	from 55/-
BREECHES	25/-
GREAT COAT	84/-
WARM COAT	65/-
RAINCOAT	55/-
PULLERS	6/6
LEGGINGS	25/-

PATTERNS POST FREE.



NATIONAL
GUARD
VOLUNTEER
TRAINING
CORPS
OUTFITS
(as approved
by
Central
Association
V.T.C.)



To
MEASURE
in
24 HOURS.
FIT AND
ACCURACY
GUARAN-
TEED.



"Hallzone" Ideal
Lounge Suit from ... 55/-
(As sold elsewhere from 3 & 4 Gns.)

"Hallzone" Ideal Morning
Coat and Vest from ... 55/-
(As sold elsewhere from 3 & 4 Gns.)

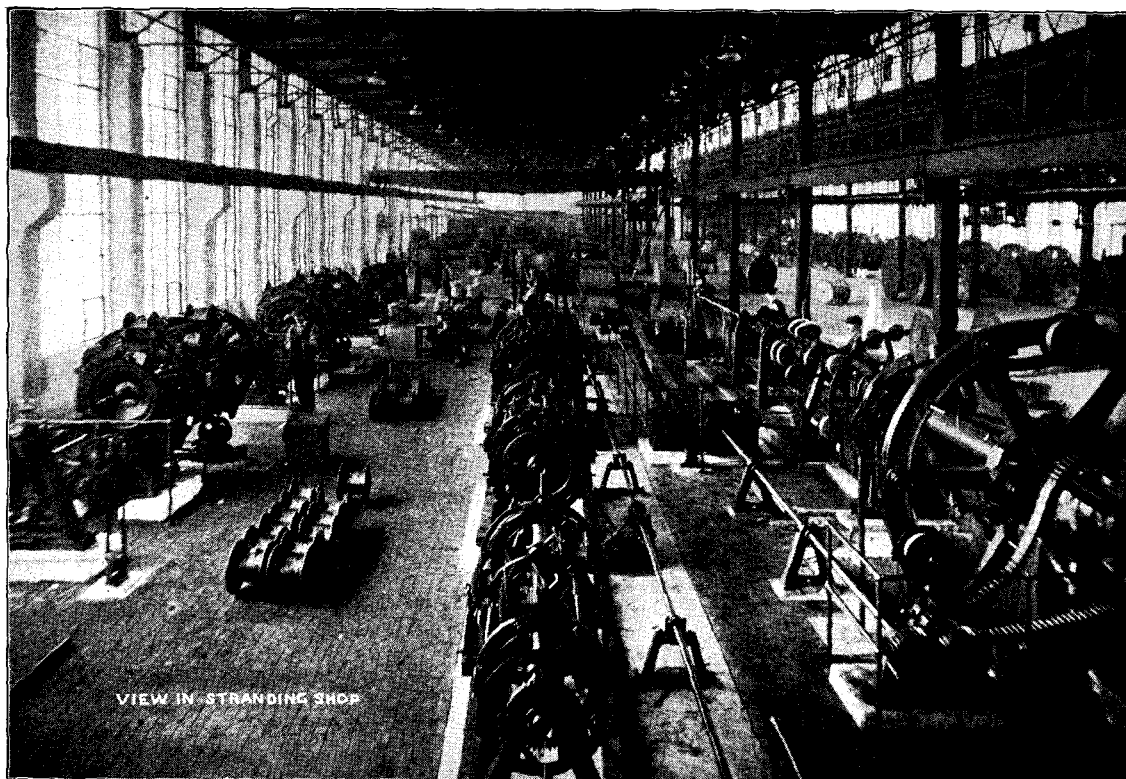
PATTERNS POST FREE.

"Hallzone" Ideal
Semi-Raglan from ... 55/-
(As sold elsewhere from 3 & 4 Gns.)

"Hallzone" Ideal
Dress Suit from ... 84/-
(As sold elsewhere from 5 & 6 Gns.)

PATTERNS POST FREE.

Perfect Fit Guaranteed for Suits, Breeches, &c. from our simple Self-Measurement Forms.
BEST MATERIALS and WORKMANSHIP ONLY. UNEQUALLED VALUE, FIT and STYLE.
Visitors to London can leave Record Measures for future use, or can Order & Fit same day.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital). Telephone: 1339 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3S. 6D. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses PER PAIR s. d. 3 6

Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames 7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE, WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

Important New Book.

Automatic Telephony

A Comprehensive Treatise on Automatic and Semi-Automatic Systems

By ARTHUR BESSEY SMITH, E.E.

Member A.I.E.E., formerly Professor of Telephone Engineering, Purdue University,

AND

WILSON LEE CAMPBELL, E.E.

Fellow A.I.E.E.

406 pages, 6 x 9, illustrated

17s. net, postpaid

See our Advertisement, January issue, page IV.

CONTENTS.

CHAPTER

I.—Trunking.

II.—Automatic Electric Company's Switchboard Apparatus.

III.—Subscribers' Station Equipment for Use with Automatic Electric Company's Two-Wire Systems.

IV.—Measured Service Equipment.

V.—Automatic System of the American Automatic Telephone Co.

VI.—Siemens and Halske System.

VII.—The Loricor System.

VIII.—Automatic Traffic Distributor Equipment.

CHAPTER

IX.—Automatic District Stations.

X.—Clement Automaton System.

XI.—The System of the Western Electric Co.

XII.—Long Distance, Suburban and Rural Line Equipment.

XIII.—Cutovers and Interconnections of Manual and Automatic Offices.

XIV.—Power Plant, Supervisory and Testing Equipment, and Circuits.

XV.—Traffic.

XVI.—Development Studies.

HILL PUBLISHING CO., LTD.,

6 & 8, BOUVERIE STREET, LONDON, E.C.

Why not open an account at CRICHTONS'

the great convenience easy terms, and splendid value are unapproachable.

A Customer writes us from St. Pancras:

"I will do my utmost to recommend you as I am so pleased with your value. Your monthly system is a boon and a blessing."

Let CRICHTONS' supply all your present needs.

Send for the Made Book, latest edition.

Coats and Skirts.

Blouses.

Trunks.

Dainty Frocks.

Charming Underwear.

New Raincoats & Macs.

Shoes.

Furs, Fur Coats,

Overcoats, etc., etc.

Everything supplied on our well-known "Times" System, strictly private and confidential, from 5/- monthly.

SPECIAL TERMS to Telephone and Post Office Staff.

Why not send a Card for details, sent quite privately.

CRICHTONS' LTD.

Manufacturing Furriers and Ladies' Tailors,

14, CRICHTON HOUSE, DEVONSHIRE SQUARE, LONDON E.C.

(One minute from Liverpool Street Station).

KNOWN AND RECOMMENDED EVERYWHERE.

Wales & McCulloch

ESTAB. 1853

Watchmakers to

The British Admiralty

FAMED POCKET WATCHES

FOR ALL ON ACTIVE SERVICE.

LUMINOUS WATCH LIST ON APPLICATION.

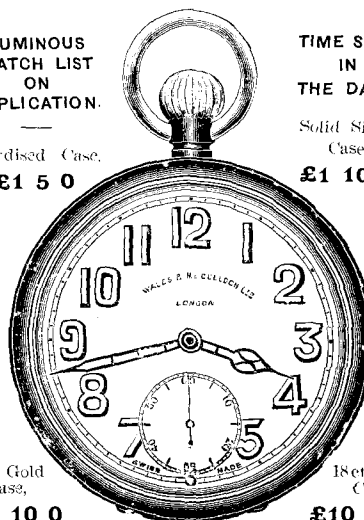
Oxidised Case.

£1 5 0

TIME SEEN IN THE DARK.

Solid Silver Case.

£1 10 0



9ct. Gold Case.

£5 10 0

18ct. Gold Case.

£10 10 0

Fine quality Keyless Lever Watch, fully jewelled, accurately timed, luminous figures and hands, showing time distinctly in the dark, in stout case with double back.

Presentation Watch Catalogue Post Free.

Special Terms to all Postal Employees.

GEM RINGS A SPECIALITE



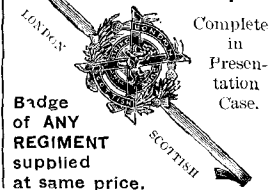
Fine Sapphire and Diamond Cluster Ring. Platinum and 18ct. Gold Mount £7 7 0.



Fine Diamond 18ct. Gold Mount £2 10 0. Others from £1 to £75. Catalogue and Size Card on application.

REGIMENTAL BADGE BROOCHES.

SOLID GOLD 13/-



Complete in Presentation Case. Badge of ANY REGIMENT supplied at same price.

20. LUDGATE HILL. LONDON. 56. CHEAPSIDE.

Near St. Paul's Cathedral.

Next Bow Church.

In normal times, practically no letters are ever left behind the proper despatch. That would be a serious matter for the officers in charge, and arrangements must always be made somehow or other to prevent any portion of the mail being delayed.

I have suggested that the sorting office is a bee hive. That is true except in at least one important point. There is not a single queen bee in the large sorting office!

Now let us return for a few moments to your letter, which I fear I have neglected.

The mail in which it is included has been taken possession of by the railway company. It is locked up in a mail van. The guard takes charge of the bag and at the exact advertised moment the mail train commences its journey. On the way to its destination other mails are taken in and put out of the train, and by the time your letter has got to its town, numerous other mails for the same town keep it company.

Mail messengers are awaiting the arrival at the other end. They quickly unload the mails from the train and then off they go to the Post Office. And now we unfold a great deal of what we did before at the office of despatch. Each bag is "called out" and ticked in. The bag opener grips the bag; examines the seal, cuts the string, teems out the contents. Then finds the bill, sees whether any registered letters are advised. If so, he gets possession of them before he does anything else, then places bills and registered letters in a wire box in front of him and does not let them get out of his sight. He cuts the bundles, then puts them on a shelf above his opening table, and the local sorting begins. Usually, local sorting is divided roughly into specified sub-offices and town. At some offices all letters for the town delivery are put on one side of a sorting desk, and those for, say, twenty sub-offices are sorted direct into divisions. Or the sub-office letters may be divided into three or more groups called sub-offices 1, sub-offices 2, sub-offices 3, and sorted direct. This is called "inward sorting." After the inward sorting process, letters are taken to the sub-office despatch desks to be again sorted, and also to the postmen's office. In all large and middle sized Post Offices the heaviest mails arrive during the early hours from midnight to 4 a.m., and sorting clerks are engaged in getting the outgoing despatches to the sub-offices ready while the postmen are busy in town sorting. Town or walk sorting is the dividing out into, say, 30 or 40 divisions, letters for the town area. For instance, at Birkenhead there are 30 walks. So that a town sorter with a letter for a street in Birkenhead decides at once whether it is to go to walk 2, 15, or 30. Every walk is again divided for the first delivery into two divisions, A and B, making actually 60 walks, one postman takes the A side and another—his partner—the B side. The morning postman who reaches your house at the comfortable hour of eight o'clock is usually due on duty at 5 a.m. to 5.45 a.m. every day throughout the year, every other Sunday excepted, and I believe he gets used to it. At least I hope he does. We are not all alike.

The delivering postman sorts out his letters into about 30 sections according to streets and houses before he puts them all in final order for delivery. The preparation of the walk by the delivery postman is about three-quarters of an hour's work. His walk is planned out by his inspector. He must start at a given point; he must proceed along given lines; and if he deviates—if he runs around a corner to deliver your letters before someone else's—because perhaps you give him a big Christmas box, there is trouble in store. He may get found out—the outdoor inspector may catch him—and like everyone else in the Post Office (and out of it) he does not like to be found out. No change in a walk may be made without the postmaster's authority.*

The postmaster is of course responsible for every part of the local organisation for the delivery and despatch of letters, and upon him devolves the work of perfecting the machinery when any part of it becomes defective, or inadequate. Now the machinery of the Post Office is liable to get out of order, because, as I have already mentioned, it is largely made, not of steel metal but of a more claylike substance.

*Some interesting paragraphs dealing with registered letters are here omitted.

(To be concluded.)

THE POST OFFICE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

The programme for the 1915-16 session will be as follows:—

1915.	
Oct. 25, Monday	... Presidential address by the Postmaster-General, followed by an address on "Telephones: Provincial Organisation and Development," by Mr. R. A. Dalzell (Secretary's Office).
Nov. 22, Monday	... "Telegraphs in India," by Mr. J. J. Tyrrell (C.T.O.).
Dec. 14, Tuesday	... Fifteen-minute papers:— "Supervision as Seen from Below," by Mr. S. A. Coase (C.T.O.). "Phonograms," by Mr. B. R. Mead (L.T.S.). "The Deficit on the Telegraphs," by Mr. W. H. F. Webb (C.T.O.).
1916.	
Jan. 24, Monday	... "Public Administration and Finance—The Correlation of," by Mr. F. C. Cook (A.G.D.).
Feb. 28, Monday	... "Loading of Telephone Circuits," by Mr. A. B. Hart (E.-in-C.O.).
March 27, Monday	... "Telegraph and Telephone Work in a Provincial Depot," by Mr. Rusk, of Edinburgh.
April 18, Tuesday	... "Telegraph tariffs and Economic needs," by Mr. John Lee (Telegraph Traffic Manager).

RECOLLECTIONS OF LORD ALVERSTONE.

THE following interesting paragraphs appear on pages 205 and 207 of *Recollections of Bar and Bench* by Viscount Alverstone:—

Among the really very important compensation cases in which I was engaged was the purchase by the Post Office of the railway interests in telegraphic business. I appeared for several railways. The Post Office were represented by the law officers of the day, and had the assistance of one of the cleverest men whom I ever met at the Bar, Mr. C. T. Simpson. He knew his case from cover to cover, and had a marvellous capacity for remembering the important points, and bringing them out in cross-examination. His manner did not impress one, as it was hesitating and apparently somewhat undecided; but when the shorthand notes of the cross-examination of the railway company's witnesses came to be read, one found that he had brought out all the points on which the Government could rely in order to attack the claim of the railway companies.

The sums paid by the Government to the owners of the telegraphs were large, but not excessive (except probably in the case of Reuter, where the award was for a very large sum of money); but the subsequent development of telegraphic business, since the telegraphs passed into the hands of the Government, has shown that the bargains then made were very advantageous to the public.

In this connexion I may mention an interesting incident in connexion with the purchase by the Post Office of the business of the Telephone Company which has lately been the subject of considerable comment in the Press. I appeared with Mr. Benjamin* for the telephone companies, the law officers of the Crown, Sir Henry James, Sir Farrer Herschell, and Mr. Fletcher Moulton being counsel for the Post Office. Judgment was delivered by Mr. Justice Stephen and Baron Pollock in favour of the Crown; but their view, that a telephone message was only another way of transmitting a message by electricity, was open to grave attack. We were hesitating whether to appeal when, one afternoon, Mr. Winterbotham, the solicitor for the Telephone Company, came to me and asked me whether I thought that the appeal would succeed. I told him that I could not say, but that there was a very fair ground for arguing that the view taken by the Court as to the nature of a "message" did not bring speech by telephone within the definition of "message," so as to give the Postmaster-General the monopoly to which he was entitled for telegraphic messages. Whereupon he produced a draft licence, and said: "The Government have offered me this," showing me the proposed terms. On looking it through, I said at once: "If you can get this, the appeal is not worth spending a farthing upon. All you want is practically conceded, and the company will be getting the profit, although working under licence from the Post Office." My view was adopted, and proved to be accurate; in the years which passed since the licence was granted until the final purchase by the Post Office last year, the company had made very large profits, and occupied a very strong position as competitors. I do not say that this result was due to any services rendered by me, but had the appeal proceeded and been successful, the Postmaster-General would never again have offered terms anything like so favourable as those which were offered to the Telephone Company, and accepted by them whilst the appeal was pending.

*In the Edison judgment case.

LETTER FROM THE FRONT.

THE following is an extract of a letter received by Mr. Stretton, of the London Trunk Exchange:—

It gives me great pleasure to drop you a line, and to let you know that I am in the best of health. You must excuse my writing to you on one of these letter cards, but I have run short of envelopes. You will no doubt have heard of the Post Office Rifles' work at Festubert, when we captured a long trench and a fort with 37 prisoners, and plenty of odds and ends. It earned us the name of the "Famous Fighters of Festubert Fame," and though we came under 72 hours' constant heavy shelling, we didn't budge from our position. It also earned us four D.C.M.'s. You will be glad to know also that I was promoted, and my new address is Cpl. F. J. Chadwick, 1377, 6th Platoon, 2nd Coy., Post Office Rifles, B.E.F., France.

SHEFFIELD SOCIAL OUTING.

On Saturday, Sept. 11, the members and friends of the Sheffield Post Office Telephone Service staff took their annual social outing; the places visited being Monsal Dale and Ashford. This year the trip was taken by motor char-a-banc instead of train, and the change was greatly appreciated. The attendance numbered 95, including twenty wounded soldiers from the different hospitals in the city, taken as guests of the members.

On arriving at Monsal Dale, time was spent in viewing the beautiful valley. The run down to Ashford-in-the-Water was pleasant indeed. Tea was waiting here to which sharpened appetites did full justice. After this various sporting events were arranged by Mr. C. Wellings for the visitors and members; the ladies being well catered for. An unfortunate accident occurred on the journey out; one of the motors breaking down and the party being stranded for two hours. After this tedious wait one of the previous char-a-bancs returned and took the shipwrecked party to the journey's end. Barring this mishap, all the members enjoyed themselves thoroughly, whilst the soldiers had a great day. Mr. H. Shaw, of the Engineers' Department, the secretary of the social club, together with a small committee, was responsible for the successful organisation of the outing.

LONDON TELEPHONE SERVICE NOTES.

If there were no Press censorship what glowing stories of duty done might be written in praise of the telephone staff and their supreme calm in the hour of danger. As it is one can be permitted to say nothing more than that "somewhere in London," or "everywhere in London" if you prefer it, the exchange staffs continued their allotted tasks the while bombs exploded and guns boomed. Not once did the voice of the female telephonist quaver as she proffered her soothing request, "Number, please." It is no small wonder that a special constable taking off his receiver and hearing such a calm response mistook for the moment the speaker for his assistant company commander and answered with deferential directness "Six, so far, Sir." Speaking of the special constabulary reminds one of the remarkable acuteness of hearing developed by some of those taking part in these by no means unexciting duties. Instances have occurred where officers employed in the heart of London have clearly heard the hum of a Zeppelin although subsequent information has established the fact that no such nocturnal visitant has been at the time within at least 50 miles.

The London Telephonists' Society's programme is now published and promises an interesting session. Mr. Beck, the Exchange Manager of Kensington, who is president this year, opens the session on Oct. 19 with an address on "Some Aspects of Service," or "Some Service," as they would say in the trenches. The meetings are to be held at the Institute of Electrical Engineers on the Thames Embankment, at the corner of Savoy Street, and the new quarters ought to add to the comfort of those attending the meetings. There is ample room for everybody who can come, and it is to be hoped the society will this year secure a membership of over a thousand. In addition to the usual competitions the society is organising a literary competition, open to all its members. The tasks allotted are two, of which the first is to write an essay on that character in fiction which in the opinion of the essayist would make the best telephonist. The second is to write a rhyme of not more than 50 lines enforcing the three cardinal points of good operating—accuracy, courtesy and speed. Here is abundant scope for your telephonist with literary tastes, and the first of the two competitions opens up a vista of possibilities almost alarming in its immensity. Fancy an essay on that character in fiction who would make the most satisfactory exchange manager or superintendent of traffic staff and buildings—the latter almost sounds fictional. Or again, imagine an essay on that character in fiction who would make the perfect (*proxime accessit*) female superintendent. Dare one go further and think of even higher posts! The cynic would say "No," for the utterances of many of these are of so fictional a character that they themselves become in effect characters of fiction, but the cynic is quite out of place in a telephonists' society. His proper sphere is writing leaders for halfpenny morning journals with strong views for or against "Conscription"—another name, so we are told, for "National Service."

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

Resignations—

Miss E. SULK (Assistant Supervisor, Class II), City Exchange, has resigned in view of her approaching marriage.

Miss V. V. QUICK (Assistant Supervisor, Class II), of Putney Exchange, has resigned in view of her approaching marriage, and was presented by the staff with a silver teapot and other useful gifts.

Miss E. E. PITTARD (Assistant Supervisor, Class II) has resigned in view of her approaching marriage, and was presented by the staff at Kensington Exchange with a dinner service and other useful gifts.

Miss INGLESON (Assistant Supervisor, Class II), at Regent Exchange, has resigned in view of her approaching marriage, and was presented by the staff with several presents, including a dinner service.

Miss A. G. STONE, of City Exchange, has resigned, and was presented by the staff with a cake basket, a case of tea spoons, tea knives, a pickle jar and other gifts.

Miss D. A. GLASSCOCK, of Victoria Exchange, has resigned.

Miss S. G. KNIGHT, of Victoria, has resigned.

Miss L. K. MAJOR, of Victoria Exchange, has resigned to be married, and was presented by her colleagues with four glass dishes and a breakfast cruet.

Miss MAY DUNTON, of Victoria Exchange, has resigned in view of her approaching marriage, and was presented with a tea service and half a dozen tea knives.

Miss M. QUALFE, of Avenue Exchange, has resigned.

Miss E. RUNACRES, of Avenue Exchange, has resigned.

Miss D. PENNEY, of Avenue Exchange, has resigned.

Miss M. BOWTELL, of Avenue Exchange, has resigned.

Miss I. BLACKMAN, of Avenue Exchange, has resigned.

Miss E. HITCHINGS, of East Exchange, has resigned to be married, and was presented by her colleagues with a pair of vases and several other gifts.

Miss DOROTHY J. TROTTER, of Ilford, has resigned in view of her

approaching marriage, and was the recipient of several presents, including a silver cake basket.

Miss H. E. CONNEL, of East, has resigned.

Miss E. H. SMITH, of East, has resigned.

Miss FLORENCE E. GRAHAM, of North Exchange, has resigned, and was presented by her colleagues with a clock.

Miss JANE NORRIS, of the Trunk Exchange, has resigned to be married, and was presented by her colleagues with a silver tea set, jam dish and other gifts.

Miss FLORENCE KRESNER, of the Trunk Exchange, has resigned in view of her approaching marriage, and was presented with a silver tea service and other useful gifts.

Miss E. L. UTTING, of Brixton Exchange, has resigned, and was presented by her colleagues with a case of fish knives and forks on the occasion of her marriage.

Miss ELSIE M. RUTLEY, of Holborn Exchange, has resigned in view of her approaching marriage, and was presented by her colleagues with a tea service and many other useful gifts.

Miss FLORENCE M. WHIPPS, of Holborn Exchange, has resigned to be married, and was presented with a wedgwood salad bowl, a silver egg cruet and several other useful gifts.

Miss G. M. FROST, of Finchley Exchange, has resigned.

Miss R. MORTIMER, of Park Exchange, has resigned.

Transfers—

Miss A. H. RAWLINGS has been transferred from City to Hornsey Exchange.

Miss D. SAYER has been transferred from Avenue to the Trunk Exchange.

Miss F. SMITH, of Western Exchange, has been transferred to Park Exchange.

Miss E. J. NAGGS has been transferred from Western to Park.

Miss A. C. SMART has been transferred from Western to Park.

Miss D. SMITH has been transferred from Park to Western Exchange.

Miss W. STAFFORD has been transferred from Park to Western Exchange.

C.T.O. PROMOTIONS.

Mr. R. W. HILL, Assistant Superintendent, Class II, to be Assistant Superintendent.

Mr. W. I. WOOD, Overseer, to be Assistant Superintendent, Class II.

Mr. S. J. SKINNER, Overseer, to be Assistant Superintendent, Class II.

Mr. A. E. BOWDEN, Telegraphist, to be Overseer.

Mr. H. J. ARCHER, Telegraphist, to be Overseer.

Mr. C. W. SPARKES, Telegraphist, to be Overseer.

Mr. E. M. DIAPER, Telegraphist, to be Overseer.

Mr. A. W. BING, Telegraphist, to be Overseer (Cable Room Establishment)

Miss E. M. MACNAMARA, Assistant Supervisor, to be Supervisor.

PROVINCIAL STAFF.

Miss M. E. PARRY, Clerk-in-Charge (Ex-National Telephone Company), Lark Lane Exchange, to be Assistant Supervisor, Class II, Royal Exchange.

Miss H. BALL, Chief Operator, Mersey Docks and Harbour, Board P.B.X., to be Assistant Supervisor, Class II, Royal Exchange.

Miss E. HUGHES, Telephonist, Central Exchange, Liverpool, to be Supervising Telephonist, Old Swan Exchange.

Miss N. W. BROWN, Senior Typist in the District Office, Chester, has left to be married, and was presented with a rosewood clock and other gifts by her colleagues.

Miss E. E. RABY, Female Clerical Assistant in the District Office, Chester, has left to be married, and was presented with a case of silver egg spoons.

Miss L. G. COOK, Female Clerical Assistant in the District Office, Chester, has left to be married, and was presented with a silver sugar basin and cream jug.

Miss A. BOWYER, Telephonist in Chester Exchange, has left to be married, and was presented by the staff with a case of cutlery.

Mr. C. F. SPEARS, Contract Manager, Chester, has been promoted to be Contract Manager, Blackburn. He is succeeded at Chester by Mr. G. W. CAMPBELL, of York.

Mr. H. A. HINCKS, Assistant Traffic Superintendent, Class I, Dundee, has been transferred as Assistant Traffic Superintendent, Class I, to Manchester.

Miss E. B. LOW, Clerical Assistant, Dundee, has resigned to be married, and was presented with a pair of oxidised silver vases and other small gifts by the District Office staff.

Miss J. B. MATHIPSON, Clerical Assistant, Dundee, was, on her resigning to be married, presented with a silver *entree* dish and other small gifts by the District Office staff.

Miss A. LABURN, Clerical Assistant, Dundee, on her resignation, was presented with a gold brooch by the female clerical staff.

Mr. DAVID McCLUNE, Contract Officer, Belfast, was the recipient of a handsome barometer from his colleagues in the Belfast Office on the occasion of his marriage.

Miss MAUD ORR, Telephonist, Belfast, resigned on June 11, to be married, and was presented by the staff with a silver lamp and ornaments.

Miss H. CURRIE, Telephonist, Belfast, has resigned in view of her approaching marriage, and was presented with a handsome tea set.

Miss M. E. INKSON, female Clerical Assistant, Sheffield District Office Telephones, resigned on Aug. 21 to be married. Before leaving she was presented by her colleagues with a handsome copper spirit kettle as a token of their esteem. Before taking up her duties in Sheffield, Miss Inkson had been for several years in the District Office, Hull.

CIVIL SERVICE MUTUAL FURNISHING ASSOCIATION LIMITED,

15, CHARTERHOUSE STREET, HOLBORN CIRCUS, E.C.

Furniture, &c., for Cash or on Extended Payments.



THE "WARLEIGH" SET IN OAK, Jacobean Style, antique finish. An enclosed Dresser 4 ft. 6 in. long, with moulded panels to the doors of the three cupboards, £4 18s. 6d.; Four Small Chairs, with rush seats, at 12s. 6d. each; One Elbow Chair to match, 19s. 6d.; a Lounge Chair, with adjustable back, upholstered in tapestry, £1 15s.; a Gate Leg Table with turned legs, size 5 ft. by 3 ft. 6 in., £2 12s.; a Copper Repoussé Mirror, £1 9s. 6d.; Bordered Art Carpet, £1 10s.; Kerb Suite, complete, 17s. 6d.

Complete for £16 12s.

The above illustration is from a booklet to furnish a flat for 60 guineas, a copy of which may be obtained free on application.

An unsatisfactory feature of the Hire System, as carried out by many firms, is that exorbitant prices are charged for the Furniture, &c., although it may be of inferior quality, so that when dealing with numerous Hire-Purchase Houses, it is practically certain that the Customer does not get the best value for his money.

The Association is, however, able to send its Clients to many of the

Best known Firms in London and the Provinces

who sell for **Cash Prices only**, and most of whom mark all their goods in plain figures.

PROSPECTUS, giving full particulars, sent on application to the Secretary.

BOOKS ON TELEGRAPHY AND TELEPHONY

AUTOMATIC TELEPHONY. A clear description of the Strowger Automatic Telephone System as adopted by the G.P.O. By S. TURNER, E.-in-C.'s Office. 32 pp., illustrated. 7d. net, post free.

TELEPHONE TROUBLES, AND HOW TO FIND THEM. On both the Magneto and C.B. Systems. Sixteenth Edition. Thousands in use. 7d. net, post free.

HANDBOOK FOR WIRELESS & INLAND TELEGRAPH OPERATORS. By CHARLES WARD. A useful and practical work. 1s. 1d. net, post free.

THE HANDY ELECTRICAL DICTIONARY. By W. L. WEBER, M.E. Contains definitions of over 4,800 distinct words, terms and phrases. 1s. 1d. post free.

THE TELEGRAPHISTS' AND TELEPHONISTS' NOTE BOOK. Third Edition. Handy pocket size, $5\frac{1}{2} \times 3\frac{1}{2}$ inches, with squared pages for Memoranda, Calculations, &c. Highly spoken of by leading P.O. officials. Price 1s. 6d. net, or 1s. 7d. post free.

QUESTIONS & SOLUTIONS IN MAGNETISM & ELECTRICITY. By W. J. WHITE, M.I.E.E. Containing solutions to all questions in magnetism and electricity set by the Board of Education and the C. and G. Inst., for the years 1907-1913. Crown 8vo. Fully illustrated. Price 1s. 8d. net, post free.

THE HUGHES AND BAUDOT TELEGRAPHS. By ARTHUR CROUCH. Invaluable to students, as a knowledge of both systems is now demanded by the examiners. Cloth 8vo. 1s. 6d. net, 1s. 8d. post free.

TECHNICAL TELEGRAPHY AND TELEPHONY. By ROBERTS and BURROWS. Fifth Edition. Containing "Hints to Students," together with an exhaustive selection of questions and model answers in all grades of the C. and G. Telegraphy and Telephony exams to 1912-13 inclusive. 2s. 2d. net, post free.

THE TELEGRAPHISTS' GUIDE. By BELL and WILSON. Absolutely the best and most up-to-date work of its kind on the market. For class teachers and students alike it is invaluable, and the repeated calls for fresh editions prove its merit. Sixteenth thousand. 2s. net, or 2s. 3d. post free.

CALCULATIONS IN TELEGRAPHY AND TELEPHONY (Ordinary and Honours Grades). By H. P. FEW, Silver Medallist, &c. Contains full solutions to the numerical problems set by the C. and G. Inst. in the Ordinary and Honours Grade of Telegraphy and Telephony from 1900 to 1910. 2s. net, or 2s. 3d. post free.

NOTES ON TELEGRAPHY. By G. MOGG. A simple exposition of the rudiments of technical telegraphy and telephony. Specially designed to meet the requirements of the C. and G. Ordinary Examinations. 2s. 6d. net, or 2s. 9d. post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY. By H. P. FEW. Includes model solutions to the C. and G. exams. 1904-1914, as well as to several typical questions set at the Post Office Departmental exams. for Overseerships. Fourth edition. Cloth. 230 pages, 172 illustrations. 2s. 6d. net, or 2s. 9d. post free.

GUIDE TO THE PRACTICAL ELEMENTS OF ELECTRICAL TESTING. By J. WARREN. A useful work, clearly expressed and well illustrated. 3s. 6d. post free.

PRACTICAL TELEPHONY. By JAS. BELL, A.I.E.E., and S. WILSON, A.M.I.E.E. A simple and practical handbook suitable for students, artisans, &c. Copiously illustrated. Latest edition. Twelfth thousand. 3s. 6d. net, 3s. 9d. post free.

MANUAL OF WIRELESS TELEGRAPHY. By Comdr. S. S. ROBISON, U.S.N. The standard text-book for Marconi students. Recommended by the editor of the P.O.E.E. Journal, The Electrical Review, and by all the leading teachers. Latest edition. Cloth, 8vo. 241 pp., illustrated. 8s. net, 8s. 4d. post free.

PRACTICAL TELEGRAPHY. By H. W. JENVEY, M.I.E.E., Electrical Engineer to the Postal Department, Victoria. A standard text-book specially suitable for Colonial telegraphists. Fourth edition, revised and enlarged. Cloth, 8vo. 444 pp. and 83 illustrations. 10s. 6d. net, 10s. 9d. post free.

TELEPHONY. By SAM'L G. McMEEN and KEMPSTER B. MILLER, M.E. The latest and best book published on the Theory and Practice of all phases of Telephone Work. 960 pp., 700 illustrations. 17s. net.

STANDARD TELEPHONE CONSTRUCTION METHODS. By FRANK B. HALL. This book contains 250 full-page drawings of standard materials and methods of construction; 280 pages of specifications and tables. No detail from sub-station to main distributing frame omitted. Price 17s. net, post free.

Sent post free at prices stated by

S. RENTELL & CO. Ltd., 36, Maiden Lane, Strand, London.

WRITE FOR CATALOGUE NO. 36.

Silk and Cotton-Covered H.C. Copper Wire,
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
13259 CENTRAL.
"ORMISTON, LONDON."

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.

THE ROWLAND HILL PERMANENT BUILDING SOCIETY.

ESTABLISHED 1883.

Chairman - J. WALKER, Esq. (London).

INTEREST PAID HALF-YEARLY

On all complete pounds at the rate of

4½ per cent. on Shares

3½ per cent. on Deposits.

For full particulars apply to:—

The SECRETARY, 1, West St., Finsbury Pavement, E.C.

CIVIL SERVICE

Share Purchase and Investment Society, Ltd.

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year.	2 Years.	3 Years.	5 Years.	7 Years.	10 Years.
17s. 4d.	9s.	6s. 2d.	4s.	3s.	2s. 4d.

Stocks and Shares bought or sold through the agency of this Society.
Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society exceeds the sum of £500,000.

The United Kingdom Postal, Telegraph, and General Civil Service Benevolent Society. (Assurance Companies' Act, 1909).

JOIN

THE NORTHAMPTON

Section A—For Ordinary Life Assurance,
" B—For GRATUITY BENEFIT,
" C—For Insurance of Wife.

MAXIMUM BENEFIT { Section A ... £150
" B ... £150
" C ... £48

The only Society in the Service, having similar objects, which
uses tables drawn up by an Actuary.

Rapidly Increasing Reserves.

Economic Management.

No Shareholders' Profits to pay.

Join the Best and Soundest Society.

Contributions according to age. The younger you join the higher the benefit.

APPLY LOCAL SECRETARY, OR OF

W. T. BRAIN, CENTRAL SECRETARY, 19, Surrey Street, Strand, W.C.

THE Telegraph and Telephone Journal.

VOL. II.

NOVEMBER, 1915.

No. 14.

CONTENTS.

	PAGE		PAGE
THE DAWN OF TELEPHONY IN BIRMINGHAM: A FEW EARLY REMINISCENCES. BY ARTHUR E. COTTERELL ...	23	EDITORIALS—	
WITH THE EXPEDITIONARY FORCE. NO. VIII. BY LIEUT. A. A. JAYNE, R.E. ...	26	TELEGRAPH CHARGES ...	34
REVIEW ...	27	THE PROTECTION OF TELEPHONISTS ...	34
OUR MONTHLY RECORD OF BRAVE DEEDS ...	27	THE NEW STATUTORY TELEPHONE REGULATIONS ...	35
LONDON-BIRMINGHAM TELEPHONE CABLE. BY P. E. ERIKSON ...	28	HIC ET UBIQUE ...	36
NOTES FROM A TELEGRAPH OFFICER'S DIARY, 1868-73. BY W. H. GUNSTON ...	32	A NEW HOPE FOR TELEGRAPHS ...	36
THE PROTECTION OF TELEPHONE OPERATORS IN NEW YORK ...	33	TELEGRAPHIC MEMORABILIA ...	37
		POSTAL AND TELEGRAPH RATES (STATUTORY LIMITS) BILL ...	39
		LONDON TELEPHONE SERVICE NOTES ...	44
		PERSONALIA ...	44

Subscription: To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies: To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

THE DAWN OF TELEPHONY IN BIRMINGHAM: A FEW EARLY REMINISCENCES.

BY ARTHUR E. COTTERELL.

"CONNECT up to Central Station." How I pondered over those words as I wrote them some half a dozen times in conjunction with a corresponding number of names and addresses in a book bearing the title of "Line Order Book." It was a dull day in November in the year 1879, but bright to me filled with youthful anticipation albeit dashed with fears. At the age of 15½ years I found myself in the office of a new enterprise, the Midland Telephone Exchange Syndicate. The office was situated in Exchange Chambers, New Street, Birmingham, being No. 2 on the first floor. The room was divided by a glass and wooden screen; on the outer side of which my desk was placed, whilst the inner space was reserved for the secretary, Mr. R. Ryder, and, wonder of wonders, contained a mysterious box, which described as a telephone, was the vehicle of conversation between the secretary's office and that of the managing director (the late Mr. H. J. T. Piercy), situated in Broad Street, some three-quarters of a mile away. This circuit was in frequent use also for the purpose of demonstrating to many visitors the marvellous powers of this recent invention which had so surprised the world.

Whilst pondering over the meaning of the phrase above referred to I overheard scraps of conversation in which the word exchange was freely mixed with some observations as to the practicability of placing different telephone circuits into communication, and when a few days later I was taken upstairs to a mysterious room called the switchroom, certain hazy ideas assumed a more definite form. About a month later the telephone exchange was opened with some dozen lines connected thereto which terminated at their distant extremities in the offices of certain stock and share brokers and other business people who had been persuaded to allow the syndicate to connect them up on a three-months' free trial with an undertaking that if approved the service (unlimited of course) should be at their disposal for £10 per annum instead of at the proposed normal charge of £20 per annum. At the end of the trial period, having proved the practicability or rather anticipated the utility of the system, the firms in question signed their final agreements and thus was launched as a business concern the

Birmingham Telephone Exchange. Shortly after some 30 or 40 metal merchants were admitted at the £10 rate as a consequence of signing on *en bloc*, and with such a nucleus the success of the exchange system was assured.

Cumbersome indeed was the switching arrangement of those days as compared with the facile devices of to-day. The indicators and jacks were assembled on an upright frame separate from the operating keys, which were displayed on a table set up in the middle of the room as a result of which the single operator in the early days had on receipt of a call to keep passing backwards and forwards between the switchboard and the operating table in order to answer a call and make the desired connexion; a roundabout procedure which could only be eliminated by the employment of two operators, *i.e.*, one standing at the indicator board and the other seated at the table, obviously an expensive arrangement in a small exchange. In the light of present-day achievements it is interesting to recall the *modus operandi*, which it will be seen was very elaborate and slow.

Fig. 1 is copied from an original photograph of the first exchange in London (Coleman Street). The Birmingham switching arrangements were precisely similar except that they comprised only one switchboard and one operating table instead of two as shown in the photograph. These switchboards were fitted for 75 lines and on the upper portion there was arranged a series of horizontal brass strips marked alphabetically and in pairs, usually described for operating purposes as "top A," "lower A," "top B" and "lower B," and so on.

These strips were painted in pairs in different colours and had bored into them numerous round holes to admit of the insertion of switch plugs. These strips were joined permanently with the operating keys on the switch table, which keys were similarly marked alphabetically. The switch cords were all quite separate from the switch board and table, being just straight cords with a plug at each end, a round one for plugging into the horizontal metal strip and a flat one for plugging into the slipper or line jack. The arrangements on the switch table comprised six pairs of lettered keys, thus A A¹, B B¹, C C¹, D D¹, E E¹, F F¹; two earthing keys, one for use with the A &c. series, and the other with the A¹ &c. series, a ringing key, a single stroke bell and a switch for diverting the line to the bell or speaking circuits respectively. As the operator needed both hands the transmitter and receiver were each fixed on standards, and a more uncomfortable arrangement could hardly be imagined.

Certainly the receiver could be raised or lowered within moderate limits, and a swivel joint admitted of some adjustment of angle, but it was very awkward to have to keep one's head leaning against the receiver with one's mouth facing the transmitter.

On a subscriber calling the operator took up a cord, inserting the flat plug in the slipper jack and the rounded plug into any vacant alphabetical strip, choosing usually a hole more or less over the subscriber's number, so that the cord fell vertically; this latter was of course not essential but convenient, as reducing crossed cords. The next operation was at the table, where the operator depressed the corresponding alphabetical key together with the earthing key and said "Exchange. Who do you want?" The subscriber then asked for the desired connexion usually by name, thus placing on the operator the necessity for finding the number, unless remembered.

The next step was to take another cord and insert the flat plug thereof in the jack of the called number and the round plug in the second strip of the pair already selected. On depressing the appropriate keys the operator also depressed the ringing key, and after releasing this latter turned over the switch and awaited a reply from the called subscriber, who prior to taking his receiver off the hook pressed his ringing button, actuating thereby the single stroke bell on the operator's table, on receipt of which signal the operator again turned the switch to the speaking position and said "Is that So and So," and on receipt of an affirmative reply said: "You are through to So and So," immediately after pressing the keys of both circuits and announcing "You are through," which done she released all keys and left the subscribers speaking to one another through the rather unsatisfactory back contact of the keys. As there were no ring-off devices the operator had to tap in from time to time.

When two operators were employed, viz., one at the board and one at the table, advice as to which keys or strips were to be used was called across the room. When only one operator was provided, as in the early days, that person had to move backwards and forwards three times for each connexion, viz., to plug the caller, to plug the called and to clear. Faults in the exchange were frequent, principally due to indicators sticking owing to their defective design, dust on back contacts of keys, which contact was "dead"—i.e., non-rubbing—and also to frequent displacement of the round plugs when inserted in brass strips, the contacts being bad unless frequently cleaned.

Needless to say that all this was before the days of traffic managers or superintendents.

At the exchange switchboard in Birmingham, as at most other places, a boy operator was employed in the early days, but in a few months the policy of employing girls was adopted, with advantage in every way.

The instruments were all of the battery type for ringing as well as speaking: Leclanche cells in boxes being provided at the subscribers' offices. The receivers were single pole Bells, and the transmitters of the type known as Blake's No. 3. Leclanche cells were used at first, but shortly afterwards No. 2 were adopted.

The line work was very crude. The wire used was of galvanised iron, No. 11 guage, which was run in a very irregular manner, mostly overhouse and attached to chimneys. The insulation was not of the best, the form used being known as shackle bells—a species of earthenware reel held by a bolt between two iron straps, which largely reduced the insulating area, particularly in wet weather.

Where a number of wires were run in a route, these heavy wires looked very unsightly and covered a comparatively large area of sky, seeing that instead of being grouped compactly on arms they were erected singly one below the other. The hideous effect was accentuated by the use of covered wires. With a view to preservation of the iron wires, which were affected not only climatically but also more particularly by chemical fumes in certain manufacturing localities, it was deemed advisable to serve them (before erection of course) with a covering of cotton and asphalt, which greatly increased their bulky appearance without attaining very satisfactory results, seeing that the wire was liable to attack at any point where the covering was abraded, thus the general effect was

that the cost of the wire was about doubled, the public and wayleave grantors' objections increased, and no very tangible saving in renewal attained.

All the lines being run as single circuits with earth return it was no wonder that induction between wire and wire became apparent as the number of subscribers' circuits grew.

Very unsatisfactory was the method of joining subscribers' circuits to the switchboard. Instead of the compact and slightly cabling in use in later days, the lines were lead in by single G.P. covered wires, which latter were joined direct to the switchboard, in consequence of which as the exchange grew a fearful tangle resulted, and it was no infrequent thing for circuits to be broken when additional leading wires were run down from the terminal standard on the roof.

Moreover disconnexion frequently took place at the juncture with the switchboard. The wires were attached by means of rather badly designed terminal screws, which latter sometimes yielded to accidental movement of the comparatively heavy wires, whilst on the other hand if the binding screws were tightened unduly the copper wire was apt to be injured, which lead to it snapping too easily. The arrangement was so defective that it was quite usual for a workman in repairing or connecting a new wire to dislocate several others.

Most of the lines connected to the exchange were of quite short lengths, but I well remember on our constructing some which were somewhat longer than the average we switched the two longest together, and had newspaper paragraphs describing the success of communication effected over a distance of *no less than four miles*.

The continued growth, even though slow, led to an extended policy, viz., that of opening another exchange, which would not only be in the first instance an auxiliary but which was intended to embody the advantages of these few months' experiences and be a model exchange, ultimately superseding the old one.

The principal ruling factors were that it should be situated on the highest ground in the centre of the city and that the apparatus should include some elaborations tending to greater reliability in the service.

The first principle was secured by renting rooms on the attic floor at 40, Bennetts Hill, and the second attempted by the provision of a modified switchboard made to the design of our consulting engineer, the late Mr. Fred Ormiston. Space does not admit of a full description in these notes, but it may be briefly pointed out that the principal modifications were the adoption of a series of turn button switches associated with connecting points in lieu of the A, B, &c. strips on the switchboard, the merit of which was that, when two subscribers were connected through, the switch could be turned, thus cutting out the wiring to the switch table together with all the complicated contacts; the substitution of elaborate operating keys, a species of Morse keys with lateral swing movements added; and the provision of galvanometers in place of bells for receiving the subscribers' reply signals. The whole arrangement was costly and, if anything, more complicated to operate than the earlier system, though it must be said that it was perhaps slightly more reliable than the New Street arrangement, in which specks of dust frequently interfered with the open back contacts on the tapper form of keys. The principal advance was an endeavour to provide some form of "ring off." This was attempted by having the line drop coils inserted between the leading-in wires and the connecting slipper, the under shoe of which was connected direct to earth. In the old board the leading-in wire was joined direct to the slipper, the shoe in turn being joined to earth through the indicator coils. As the flat plug in each case had an insulating piece below the brass connecting piece, it will be clear that whilst under the old system the indicator was cut out on the insertion of a plug, it was left in circuit under the later design. Thus when two subscribers were connected they had two sets of indicator coils in series to talk through, which diminished the strength of speech. In order to reduce this disadvantage the two coils of each indicator were afterwards joined in parallel, a change which reduced their signalling efficiency considerably and necessitated so delicate an adjustment of the armatures that the signal drops often fell on occasions when the switchboard was subjected to vibration. The

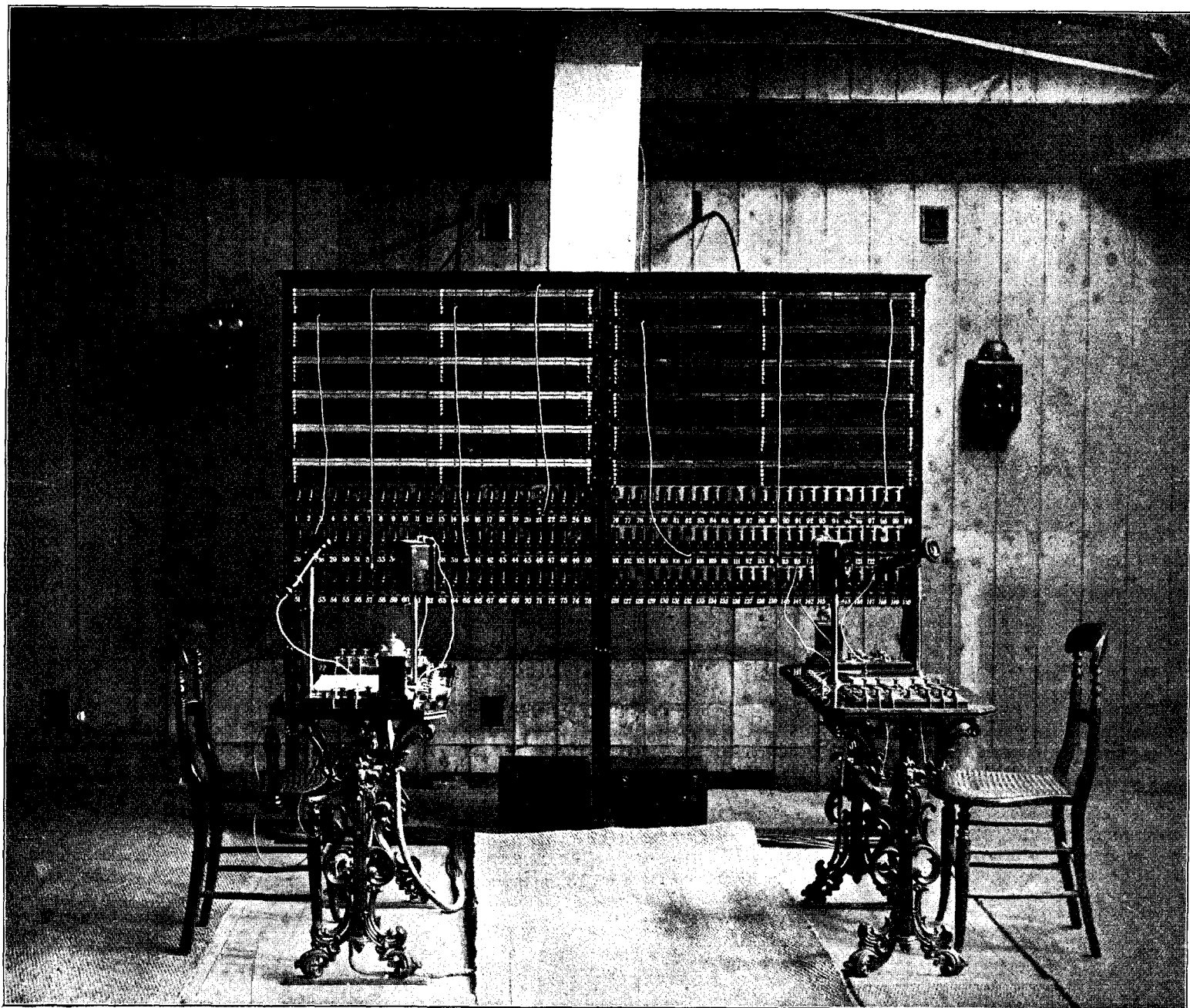


FIG. 1.

provision of even this inefficient means of ringing off soon brought to light suggestions that the subscribers did not always remember to ring off, and an attempt to make this automatic led to the provision of an additional contact in the subscribers' instruments in connexion with the switchhook. The success of this was marred by the fact that the contact was rather too fleeting for such sluggish indicators, and also that if by chance two subscribers hung up their receivers simultaneously the battery currents opposed one another.

Not a little humorous was the method adopted in regard to junction working between the two exchanges. The junctions were of course terminated on the two switchboards respectively, but were operated by a call wire which was in reality a private wire terminating on wall instruments in each exchange. When, therefore, a through connexion became necessary, an operator at the outgoing end had to leave the switchboard and go to the private wire instrument, ring up the distant exchange, and on gaining attention make a mutual arrangement with her distant colleague as to which junction should be used. Clearing orders were given in the same way.

Amidst all these gropings an interesting enterprise comes to

mind when I recall the laying of an underground wire in order to connect a subscriber's residence in the important suburb of Edgbaston. The landowner strongly objected to overhead wires, and to get over this difficulty it was decided to lay a G.P. covered wire in earthenware pipes for a distance of about one and a half miles. The total length of the circuit was about two and a half miles, aerial and underground. It was completed on Christmas Eve 1880, and is believed to be the first underground telephone circuit ever laid. It was regarded as a great experiment and successful, although the conversation seemed "muffled."

This reference to underground work serves to recall the laying of an underground cable from the exchange to a terminal pole in Great Charles Street, some quarter of a mile distant. Although in referring to this I momentarily pass on to the year 1883, I believe I am justified in saying that it was the first underground telephone cable. The cable comprised fifteen 4-wire cables constructed of No. 20 copper wire, G.P., to No. 11, served with a hemp and braided covering. These small cables were laid side by side, tied together at intervals with ordinary white tape and drawn through 3-inch iron pipes. On completion the work of testing

thoroughly was entrusted to me, when I found that of the 60 wires four were disconnected, having probably been broken in the drawing through operation, but 56 circuits were good. The general and primitive transmission tests on these 56 wires were on the whole satisfactory, and the cable apart from its practical utility afforded great opportunity for experiments in regard to induction. On the whole the main experience encouraged the Company to lay three more cables in the following year. A point of interest about these later cables was the introduction of a fifth wire in each quad.

This wire was merely cotton covered and laid by the manufacturers amidst the four working circuits. It was connected to earth at each end of the cable when laid, the idea being to overcome or minimise induction between the working wires. The theory underlying its application was as follows:—

It was known that a current in any one of the wires would induce reversed currents in the adjoining wires, it was therefore argued that this core wire being connected directly to earth, and consequently being a circuit of greatly less resistance would be more strongly affected than the other or working wires, hence it would follow that the reaction would diminish at least the inductive disturbances. It may certainly be said that a perceptible effect was noticeable, though it did not come up to anticipations.

Returning to the year 1880 I should mention that it was decided to open an exchange in the neighbouring town of Wolverhampton, and this naturally led to the need for providing trunk connexion.

Meanwhile the fair skies had been rent by a bolt from the blue. The Post Office had stepped in with the announcement that the telephone was an infringement of its monopoly, and the High Court upheld that the telephone was a telegraph, and henceforth the parent company in London and its subsidiary companies throughout the country were only permitted to continue under license and subject to a tribute of 10 per cent. of their gross exchange receipts.

But the Post Office was not all gall as it came to the Company's aid, renting a trunk line to Wolverhampton, thereby saving the Company from the serious expense and difficulty in those early days of providing its own route. I well recall the curious appearance, in those days, of aerial wires run on the twist and the comment which it evoked.

The charge for practically unlimited use of the Birmingham-Wolverhampton trunk line was, as far as my memory serves, about £7 per annum per subscriber over and above the local subscription.

With the provision of a metallic circuit trunk wire there arose the question of how to join the local subscriber's single earth circuit wire thereto. This was met by the adoption of translators, by means of which the various circuits were connected inductively. The earlier forms of translators which did not give very good results were subsequently improved upon, and commercial results were obtained by this method for quite a number of years.

(To be continued.)

WITH THE EXPEDITIONARY FORCE.

THE BAILLEUL OF "TOMMY ATKINS."

BY LIEUT. A. A. JAYNE, R.E.

No. VIII.

NOT many soldiers or indeed Britishers had heard of Bailleul before the war, but since then it has become famous as being one of the principal towns in the war zone of the British Expeditionary Force. Opinion is divided as to which pronunciation, "Balloo" or "Ballool," is accepted by "Tommy," but it is certainly one or the other, just as Ypres is "Wipers" or "Yeeps." M. Mannier gives the following variations of the name Bailleul:—Bailloel, Baluelle, Bailleu, Baillu in the eleventh and twelfth centuries; Balliolium, Bellula, &c., in Latin charters of the Middle Ages; Belle, in Flemish: he says, "Meyer and Grammaye state that the ancient name of this town was Belgium, from which came Belliolium and Balliolium."

There seems to be little doubt as to the antiquity of the town. It possessed a castle, which was sacked and demolished by the Normans in 882: it was fortified in 948, and in 1072 other fortifications were added.

For centuries the family of de Bailleuls were famous in Flanders, and in very early times were Châtelains of Bailleul. Baudouin III., Châtelain of Bailleul, married the Châtelaine of Ypres. The Châtelains in Flanders were officers, appointed by the Count of Flanders to take charge of the fortresses erected to defend the country from the invasions of the Normans. There were a great many of them; and the greater part at a later period bore the title and exercised the jurisdiction of viscounts.

Baudouin III. de Bailleul was styled "By the Grace of God Châtelain of Ypres." He took the cross in 1187, with the Count of Flanders, in the quality of captain of his bodyguard, and before setting out for the Holy Land, granted to the lepers of Ypres ten *razières* of wheat charged on the revenue of his mill outside the town of Bailleul. The *razière* was an ancient dry measure in Flanders.

In connexion with the battles that have been fought during the past year in the vicinity of the Ypres-Nieuport canal it is interesting to recall that in 1251 Baudouin de Bailleul sealed an ordinance concerning the excavation of the canal from Ypres to Nieuport.

Knowing poor mangled Ypres of 1915, is it not touching, from a historical point of view, to read that in 1280 great riots occurred there known in history by the name of "la Kokerulle?"

The trade unionists of Ypres, with those of Poperinghe, rose in revolt. They traversed the town of Ypres, fully armed, ranged under banners, and crying "Kokerulle." I am not able to ascertain what "Kokerulle" meant. They broke the gates, killed and wounded several persons and sacked and pillaged many houses, not even respecting the churches. One, Sohier de Bailleul was sent to Poperinghe to hold an inquest as to those who were at the riot.

Several of the witnesses examined on this occasion were either unable or unwilling to give any information. Thus Jehans Bornine "jura et dist par son serment ke il neu set riens a dire." Boidins Tubins, telliers, behaved in a similar manner as did Lambins Meus, drappiers, and Lambekins Noidin. All of which goes to show that to know nothing about an event under enquiry is not confined to time any more than it is to countries.

I am sorry these notes are rather scratchy and get away from what I am pleased to call my subject, but if the reader at home is not interested perhaps some of my colleagues serving out here will be. I certainly find great interest in reading, as I am, sketches of places grown familiar to me during the past twelve months. I dropped across the book from which I am extracting these notes in the archives of the ancient town hall, and Monsieur le Maire very graciously lent it to me for a few days.

It appears that one Robert de Bailleul was concerned in other troubles at Ypres in September 1566, and made agitation in the town during several days; extracting from the magistrates, as a consequence of their submission to the agreement between the sectaries and the magistrates, that the church of Brieleu, or that of Saint Nicholas, should be given to those of the new religion, for them to use for their preaching and ceremonies. These demands were not however granted, and Robert de Bailleul and others traversed the town of Ypres on horseback before many persons who were anxious to see the bearing of the new soldiers; those of the new religion being joyful; the others sad, as fearing some new misfortunes. These gentlemen were lodged at the Zwerdeken, "an ancient hostelry still existing," the historian writes, at Ypres. The hostelry isn't there now. Whilst they were at table the sectaries came and sang psalms before the hotel. The end of it was that Robert was banished and his property confiscated.

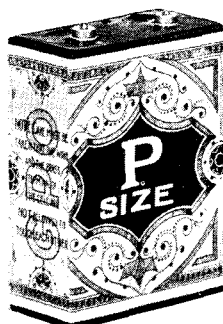
Later on Jacques and Antoine de Bailleul quietly disappeared from Flanders, having privately sold their estates at Steenvoorde, and the assumption was that they had taken up the new religion. At the same time a family of the same name appeared in Cambridge-shire, England. These de Bailleuls soon obtained the name of Bayley, and the connexion between the new name and the old is quite clearly proved by the author of *The Bailleuls of Bailleul*.

SIEMENS DRY CELLS

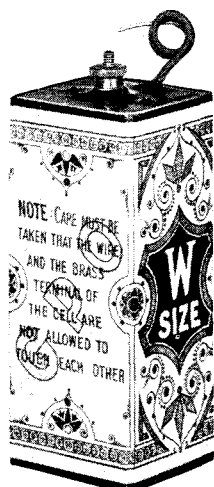
BRITISH
POST OFFICE
STANDARD
SIZES.



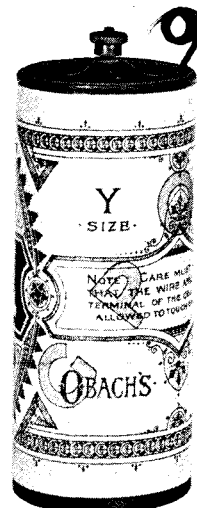
$1\frac{1}{2} \times 1\frac{1}{2} \times 4\frac{1}{2}$ in. high.
Weight: 10 oz.



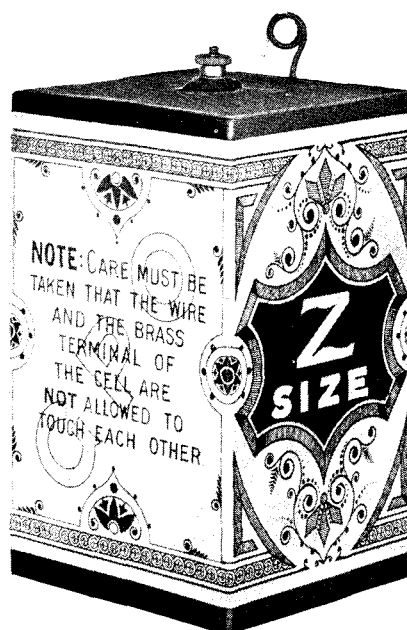
$2\frac{1}{4} \times 1\frac{1}{2} \times 3\frac{3}{4}$ in. high.
Weight: 1 lb.



$2 \times 2 \times 5\frac{1}{2}$ in. high.
Weight: 1 lb. 6 oz.



$2\frac{1}{8}$ in. diam. \times 7 in. high.
Weight: 2 lb. 6 oz.

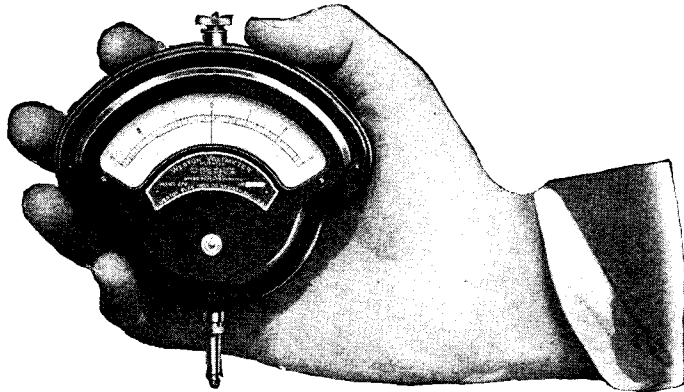


$4\frac{7}{8} \times 4\frac{7}{8} \times 8\frac{1}{2}$ in. high. Weight: 9 lb. 10 oz.

SIEMENS BROTHERS & CO., LTD., WOOLWICH.

WESTON

Miniature Precision D.C. Instruments



MODEL 279 BATTERY TESTING VOLTMETER.

The instrument is fitted with a Detachable Spike Terminal and Flexible Lead with Spike Terminal.

DELIVERY FROM STOCK.

Weight, 11.6 oz. List Price, 49/-

WRITE FOR LIST D3.

WESTON ELECTRICAL INSTRUMENT CO.

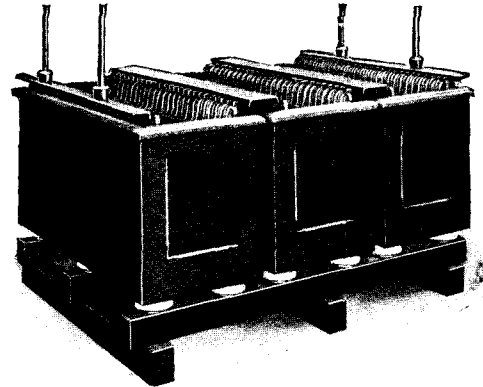
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

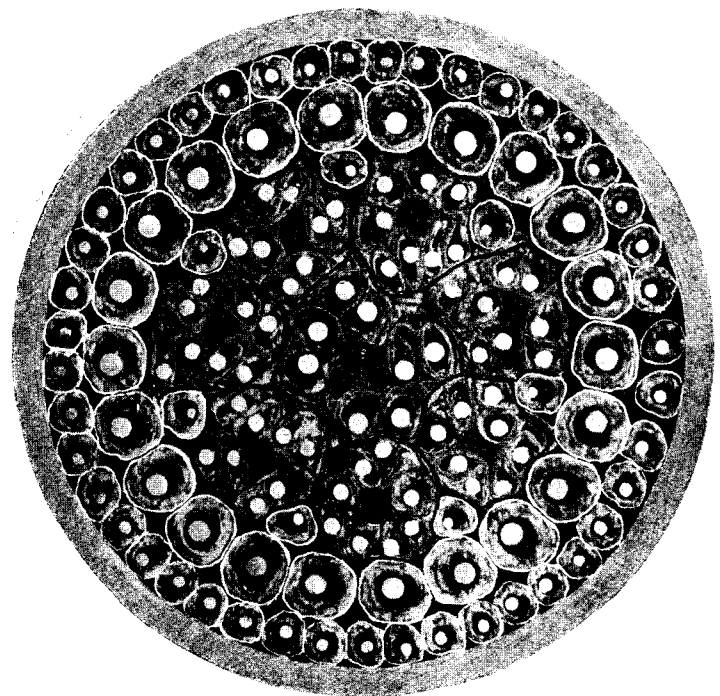
DRY CORE TELEPHONE CABLES.

*Electrical Plant of every description
for Power, Lighting, and Wireless
Installations.*

JOHNSON & PHILLIPS L^{td}

CHARLTON, LONDON, S.E.

ESTABLISHED 1875.



REVIEW.

The Wireless Telegraphists' Pocket Book. By J. A. Fleming, M.A., D.Sc., F.R.S., M.Inst.E.E., &c. (The Wireless Press, Ltd., Marconi House, Strand, W.C. 347 pages. Price 6s. net.)—This book modestly claims to be merely a collection of formulae, data and tables useful in practical radio-telegraphy. As a matter of fact, however, the information which it contains is so extensive that it covers practically the whole of the requirements of a practical wireless man, except as regards the heavy engineering side of his profession.

The book opens with a chapter in which the mathematical methods used in dealing with the problems met with in wireless telegraphy are discussed. Co-ordinate geometry, simultaneous equations, determinants, vector algebra, logarithms, trigonometry, differential and integral calculus including differential equations, vector analysis and hyperbolic functions are all treated briefly, but sufficiently fully to enable anyone with a fairly good preliminary mathematical knowledge to understand the results obtained.

The second chapter deals with units, dimensions and systems of measurement—most important subjects for the practical man, who frequently meets with great difficulty when endeavouring to apply a theoretical result to a concrete case. Tables are given showing the important constants required in wireless work.

The third chapter treats of the calculation and measurement of the resistance and inductance of a circuit when high frequency currents are used, and the fourth chapter deals with the measurement of high frequency currents and voltages, current flow in reactive circuits, and electric oscillations.

In the fifth chapter the methods of measuring and calculating capacities are given. The question of the energy losses in a condenser is also discussed, and a method by which these losses can be measured is described.

The sixth chapter deals with bridge methods of measuring resistance and inductance. The Crompton potentiometer and its use is also described.

In the seventh chapter the questions of wave length and decrement measurements are dealt with, and in connexion with the latter the energy losses in condensers are again considered.

In the eighth chapter the theory of the radiation from various forms of oscillators is discussed, and methods are given for the measurement of antenna resistance and radiation, and for the predetermination of the natural frequency of the complex oscillator made up of an aerial and associated tuning apparatus.

The ninth chapter deals with transmitters and high frequency alternators, the tenth chapter with receiving circuits and detectors, and the last chapter contains practical information for operators, including the international and American Morse codes, hints on the care of secondary cells and wireless apparatus, and finally a glossary of technical terms.

The remainder of the book contains tables of squares, cubes, natural and Napierian logarithms, trigonometrical functions, circular and hyperbolic functions, data of size, weight and resistance of wires, specific resistance of metals and alloys, and dielectric constants.

At the end some sheets of squared paper are bound in, which will prove useful for recording the results of measurements.

Throughout the book numerical examples illustrating the application of the various formulae are freely introduced.

It will be seen that the amount of information contained in the book, which, unlike some "pocket" books with which we are acquainted, is of quite convenient size for the pocket, is very extensive. Of course, owing to restrictions of space, it has not been possible to deal fully with the various matters discussed, but in cases where further explanation is desirable references are given to sources from which full information may be obtained. The book as it stands, however, is remarkably complete, and is also—a rare feature in "pocket books"—quite readable. We know from personal experience the difficulty of carrying reference works to some of the places where wireless stations are erected, and we can confidently say that the engineer or operator will appreciate finding in this book, in an extremely portable form, a source of information for which he would otherwise have to be provided with two or three bulky volumes.

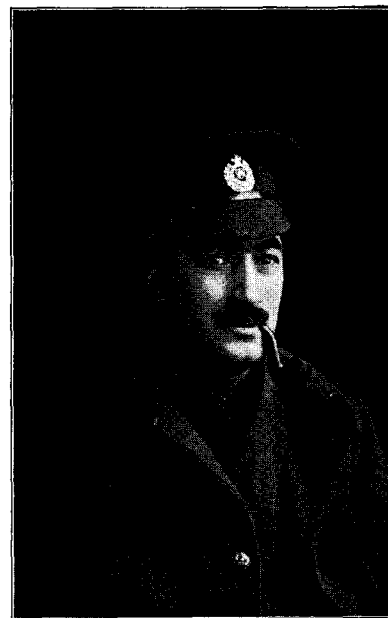
OUR MONTHLY RECORD OF BRAVE DEEDS.

Lieut. G. W. WANSTALL, Cable Company, Royal Engineers (S.C. & T., Leeds), awarded the Military Cross

"For conspicuous gallantry on several occasions during the operations on the Gallipoli Peninsula, especially on June 19, 1915, when he successfully repaired telegraph lines, with the assistance of three men, making 33 joints in a space of 150 yards whilst under heavy shell fire. Lieut. Wanstall performed similar valuable service on July 5 and 7, on all occasions under shell fire."

Sapper D. LAMONT, 52nd Lowland Divisional Signal Company, Royal Engineers (T.F.) (S.C. & T., Glasgow), awarded the D.C.M.

"For conspicuous gallantry on July 12, 1915, on the Gallipoli Peninsula. When sent to repair a telegraph line in a front trench he found the communication trench blocked, but climbed the parapet and advanced under heavy shrapnel fire over the open, and repaired the line."



SAPPER D. LAMONT.

Sapper Lamont, after leaving school, entered the Post Office by open competition, securing nineteenth place in the list for Great Britain. According to a correspondent "he appears to be the most optimistic soldier in Gallipoli at the present time, just as he was the most optimistic S.C. & T. in the Glasgow Post Office in the past." He is an amateur violinist and singer of more than usual talent.

Corpl. A. T. Britton, Royal Engineers (R.E., Telegraphist), awarded the D.C.M.

"For gallantry and efficiency in the performance of his duties."

Sergeant F. KENNEDY, 8th Signal Company, R.E. (S.C. & T., Glasgow), awarded the D.C.M.

"For conspicuous gallantry and valuable service rendered at Neuve Chapelle from 10th to 14th March. He kept up telephone communication under heavy fire throughout the whole of the operations."

Sergeant D. D. C. MUNRO, 2nd Battn. Gordon Highlanders (S.C. & T., Edinburgh), awarded the D.C.M.

"For gallant conduct and resource at Neuve Chapelle on March 12, 1915, when he led his men forward with ability to assist the 6th (Banff and Donside) Battn. Gordon Highlanders in their attack upon the enemy's trenches."

Acting Company Sergeant-Major Munro has since received the Medal of St. George, 1st Class (Russian), for gallantry and distinguished service in the field.

Sapper S. M. CHAPMAN, 1st General Headquarters Signal Company, R.E. (Telegraphist, C.T.O.), awarded the D.C.M.

"For conspicuous gallantry and devotion to duty on several occasions near Ypres under heavy shell fire; also on Oct. 30, 1914, near Klein Zillebeke."

Sergeant C. H. LLEWELLIN, "D" Airline Section, Royal Engineers (S.C. & T., Birmingham).

"For conspicuous gallantry and devotion to duty, and for performing excellent technical work while superintendent of an advanced signal office."

Corporal G. A. WALKER, Royal Engineers Signal Service (S.C. & T., Leeds), specially mentioned in despatches. The relative passage from Sir Ian Hamilton's despatch from the Dardanelles reads:

"The working of the telegraphs, telephones, and repair of lines, often under heavy fire, has been beyond praise. Casualties have been unusually high, but the best traditions of the Corps of Royal Engineers have inspired the whole of their work. As an instance, the central telegraph office at Cape Helles (a dug-out) was recently struck by a high explosive shell. The officer on duty and twelve other ranks were killed or wounded, and the office entirely demolished. But No. 72003, Corporal G. A. Walker, Royal Engineers, although much shaken, repaired the damage, collected men, and within 39 minutes re-opened communication by apologising for the incident, and by saying he required no assistance."



SERGEANT C. E. WILLIAMS.

Sergeant C. E. WILLIAMS, 42nd East Lancs. Divisional Signal Co., Royal Engineers (T.F.) (S.C. & T., Manchester), awarded the D.C.M.

"For conspicuous gallantry and coolness in action on the Gallipoli Peninsula during 1915. He has frequently laid wires under heavy rifle and shrapnel fire, and has consistently shown great bravery and resource."

Pte. H. J. HASTINGS, 2nd Battn. Oxfordshire & Buckinghamshire Light Infantry (Telegraphist, C.T.O.), awarded D.C.M.

"For conspicuous gallantry during night attacks by enemy on Oct. 23. Remained under a culvert with three other men, took Germans in flank with great effect, killing 23 himself."

Pte. Hastings had previously been awarded the Medal of St. George, 3rd Class (Russian), for gallantry and distinguished service in the field.

Lance-Corpl. L. A. BOURLAY, 7th Divisional Signal Company, Royal Engineers (S.C. & T., Shrewsbury), awarded the D.C.M.

"For gallantry and good work at signal station under shell and rifle fire."

Corpl. Bourlay has also been awarded the Medal of St. George, 3rd Class (Russian) for gallantry and distinguished service in the field.

Sergeant J. H. S. CHRISTIAN, Leicestershire Yeomanry (S.C. & T., Leicester), awarded the Cross of the Russian Order of St. George, 4th Class.

"For gallantry and distinguished service in the field."

Corporal W. MUNDAY, Royal Marine Light Infantry (Night Telephonist, London Telephone Service), mentioned in Gen. Sir Ian Hamilton's despatches of June 12 from the Dardanelles.

LONDON-BIRMINGHAM TELEPHONE CABLE.

By P. E. ERIKSON.

In the issue of Sept. 10, 1915, the *Electrician* published an account of some service tests, carried out with the new loaded telephone trunk cable, which the Post Office recently opened for traffic between London and Birmingham.

As several novel features are introduced in the construction of this cable, and as it marks a big stride forward in the use of cable for long distance telephony, it is thought that a more detailed description of the London-Birmingham cable will be of interest to readers of the TELEGRAPH AND TELEPHONE JOURNAL.

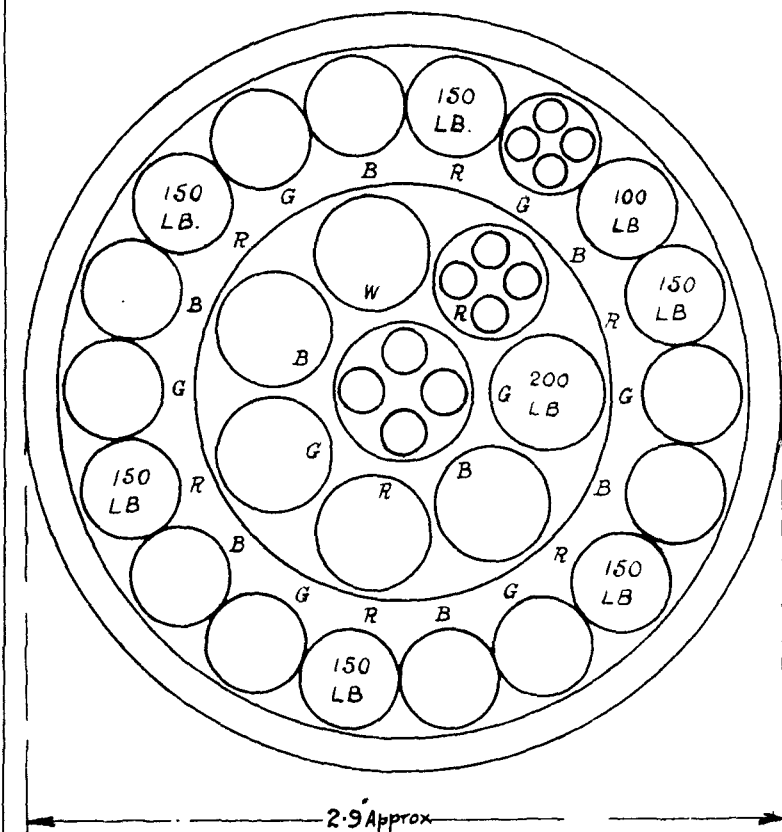


FIG. 1.

Fig. 1 is a graphic representation, in cross-section, of the arrangement of the copper conductors which go to make up this cable. The cable is designed upon the principle known among telephone engineers as the "multiple twin." The individual conductors, properly insulated with paper, are twisted into pairs. Two pairs are then again twisted into a four-wire unit, commonly referred to as a four-wire core, or "quad." The four-wire cores are stranded to form the cable proper, which in this particular case consists of a centre core, surrounded by two layers containing seven and eighteen cores respectively. Referring to Fig. 1, the centre core consists of four wires, each having a diameter of .137 inch (3.48 millimetres). A copper conductor of this diameter weighs 300 lbs. per statute mile (84.6 kg. per km.).

Surrounding the centre core in a concentric layer are seven cores, each consisting of four conductors, the diameters of which are .112 inch (2.84 mm.). The weight of this conductor equals 200 lbs. per statute mile (56.4 kg. per km.). In order to distinguish

between the four-wire units in this layer the paper around the various units is coloured red, white, blue or green.

The outside layer contains conductors of two different sizes. There are six four-wire cores, containing conductors with a diameter of .097 inch (2.46 mm.); and twelve four-wire cores containing conductors with a diameter of .079 inch (2 mm.). The larger sized conductor weighs 150 lbs. per statute mile (42.3 kg. per km.); the smaller conductor weighs 100 lbs. per statute mile (28.2 kg. per km.). The cores in the outside layer are so arranged that the 150-lb. conductor cores are separated by two 100-lb. conductor cores. For the sake of identification the 150-lb. conductor cores are covered by a wrapping of red paper, while the 100-lb. conductor cores are covered with blue and green paper alternatively.

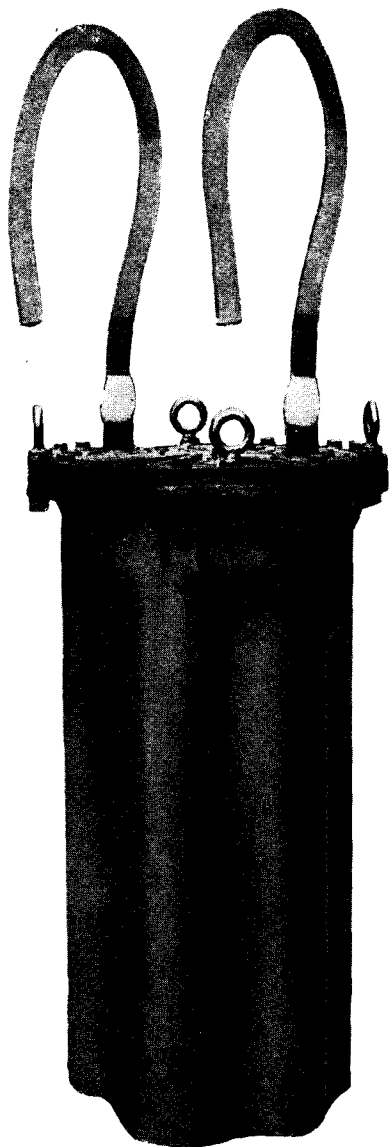


FIG. 2.

Within a four-wire core two wires, forming one pair, have similarly coloured paper insulation. Thus, in a four-wire unit, identified by blue or red paper wrapping, one pair has red and the other pair white paper insulation over each conductor. The two wires of a pair are distinguished by a red cotton string, wrapped over the insulation on one wire and a white cotton string, wrapped over the other insulated wire.

The whole cable core is surrounded and protected by a lead sheath of an average overall diameter of 2.9 inches (73.8 mm.), the average thickness of the lead being .150 inch (3.81 mm.). The average weight of the lead sheath per statute mile is 34,000 lbs. (9,588 kg. per km.). The total weight of the cable per statute mile is 49,200 lbs. (13,874 kg. per km.). The cable is run in earthenware multi-way ducts of $3\frac{3}{8}$ inches (85.7 mm.) internal diameter.

The "multiple twin" construction, when properly carried out, insures absence of overhearing between the "superposed" or "phantom" circuit and its component "side" circuits (sometimes referred to as "physical" circuits). The "superposed" principle, as applied to non-loaded telephone circuits, has been known and been in use for several years. It is only within the last three or four

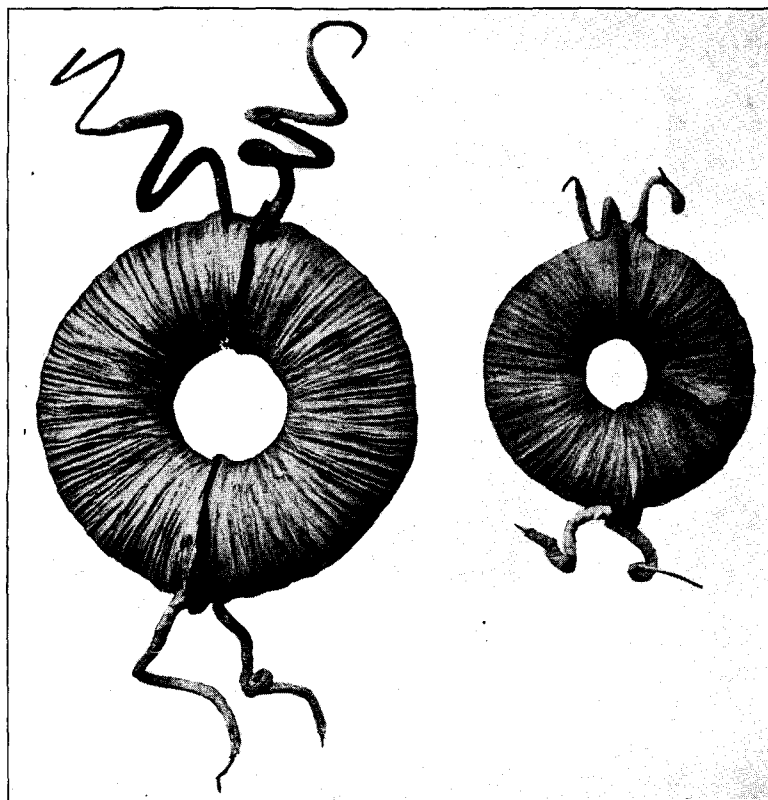


FIG. 3.

The larger coil represents Nos. 536 and 545, and the smaller one No. 535.

years, however, that circuits so formed have been successfully improved in transmission by the use of loading coils in the superposed as well as the side circuits. This has been accomplished (1) by carefully balancing the sections of the cable before the loading coils were inserted, and (2) by the use of loading coils, specially

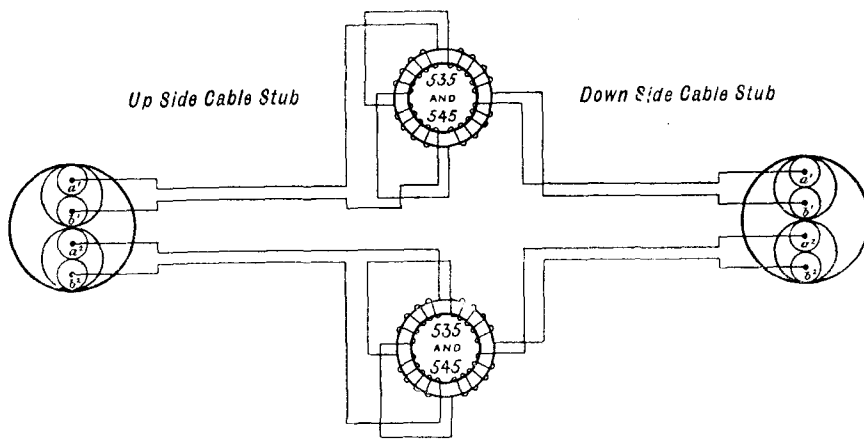


FIG. 4.

designed to give a high degree of electrical balance between the various windings. The result obtained with this combination of balanced cable and loading coils have been eminently satisfactory, the Post Office official tests having proved the phantom circuits to be commercially quite free from overhearing.

The net length of the London-Birmingham cable is 109.5

statute miles (173.6 km.), and the loading coils are inserted at normal intervals of 2.5 miles (4 km.), the end-sections at London and Birmingham being .7 mile (1.13 km.) and 1.32 miles (2.13 km.), respectively. Each loading section was balanced separately in accordance with the method described in and covered by British Patents No. 2,009, 1913, and No. 2,508, 1913, owned and controlled by the Western Electric Company, Limited.

The 52 pairs contained in the London-Birmingham cable are all provided with loading coils. In addition, the six four-wire cores which are made up of conductors, weighing 150 lbs. per mile (2.46 mm.), and six of the four-wire cores with 100-lb. conductors (2 mm.) are loaded on the "superposed" circuits.

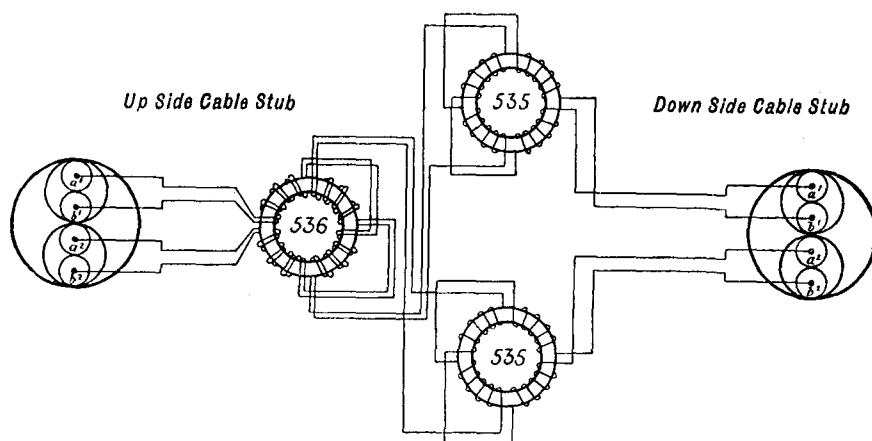


FIG. 5.

At each loading point and mounted in one large iron case (Fig. 2) are:

- 50 loading coils, W. E. Co., type No. 535.
- 12 " " " " " " No. 536.
- 2 " " " " " " No. 545.

Table I gives a summary of the electrical data of these three types of loading coils.

TABLE I.

Type of Coil.	Inductance (Henry).	Windings in series.		Maximum Mutual Capacity between windings (Mfd.).
		Maximum Effective Resistance at 800 p.p.s. (Ohms).	Maximum Steady Current Resistance (Ohms).	
No. 535 ...	.135	6.75	3.4	.0035
No. 536 ...	.082	4.10	2.0	.0007
No. 545 ...	.135	4.72	2.6	.0035

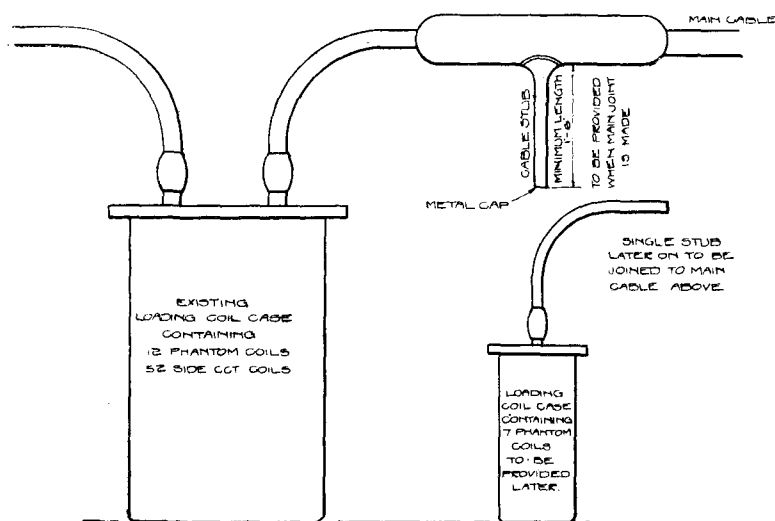


FIG. 6

The insulation resistance between the windings and between the windings and the containing case is guaranteed to be not less than 1,000 megohms, when measured with 100 volts' direct current and one minute's electrification. The values, as tested, usually exceed 10,000 megohms.

It will be noted that the No. 535 and the No. 545 coils have the same inductance. The effective resistance of the latter coil is, however, about 30 per cent. lower than that of the former at the frequency specified (800 p.p.s.).

The mechanical dimensions of the No. 536 and No. 545 loading coils are about the same, both being somewhat larger than the No. 535 coil, as will be seen from the photographic reproduction in Fig. 3.

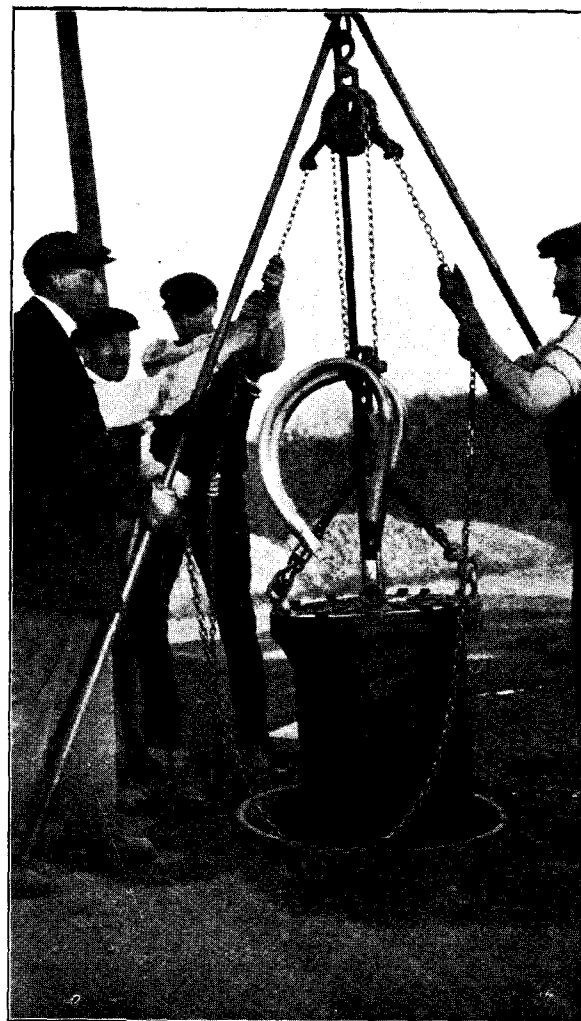


FIG. 7.

The No. 535 loading coils are inserted in 100-lb., 150-lb. and 200-lb. side circuits, with the No. 536 loading coils in the superposed circuits of the six 150-lb. and the six 100-lb. conductors, so loaded. The two No. 545 coils are connected to the 300-lb. conductor (3.48 mm.) side circuits, the superposed circuit of which is not loaded.

There are thus two distinct types of loaded circuits in this cable, viz.: (1) those having their side circuits only loaded, and (2) those in which the superposed circuit is loaded as well. Fig. 4 shows the method adopted in inserting the first mentioned type, while Fig. 5 represents a complete loading unit, consisting of two side circuit coils, No. 535, and one superposed circuit coil, No. 536. The leading-out wires from all of the coils are contained in two separate cable studs, protruding from the iron mounting case. These leading-out cables contain paper insulated conductors, which in colour scheme and lay-up are identical with the main cable. This method greatly facilitates the correct jointing of the

TABLE No. 2.
ELECTRICAL CONSTANTS OF LOADED CABLE.
Distance London - Birmingham 109.5 miles (176.2 Km.).

Diameter of Conductor and Type of Circuit.	Direct Current Tests of Loops.						Alternating Current Tests $2 \pi n = 5,000$.					
	Resistance.		Capacity.		Inductance.		Attenuation		Character- istic Im- pedance. (Mean Values.)	Transmis- sion Equi- valent in Miles of Standard Cable.	Attenua- tion length.	
	Ohms		Mf.		Henry		Constant					
	per Mile.	per Km.	per Mile.	per Km.	per Mile.	per Km.	per Mile.	per Km.				
.137" (3.48 mm.) side circuit ...	6.55	4.06	.0568	.0352	.055	.034	.00408	.00253	900	4.2	.45	
.112" (2.84 mm.) side circuit ...	9.62	5.96	.0655	.0406	.054	.033	.00664	.00412	900	6.9	.73	
.097" (2.46 mm.) phantom circuit...	6.56	4.07	.1057	.0655	.035	.022	.00756	.00469	586	7.8	.83	
.097" (2.46 mm.) side circuit ...	13.13	8.14	.0697	.0432	.054	.033	.00884	.00548	900	9.1	.97	
.079" (2.00 mm.) phantom circuit...	9.50	5.89	.0905	.0561	.036	.022	.00926	.00574	586	9.6	1.01	
.079" (2.00 mm.) side circuit ...	18.38	11.39	.0568	.0352	.053	.033	.01074	.00665	900	11.2	1.18	

loading coils to the main cable, the leading-out cable being, to all intents and purposes, a facsimile of the main cable.

For the present it is not considered necessary (from transmission and traffic considerations) to load the superposed circuits of the 200-lb. conductors (2.84 mm.). Arrangements were, however, made during the cabling operations so that, at a future date, loading coils can be inserted in the 200-lb. superposed circuits without disturbing any of the existing joints or other working circuits.



FIG. 8.

The method adopted for this purpose is made clear by the diagram in Fig. 6. The joint between the loading coil case and the cable (in the London direction) was wired in such a manner as to allow the 200-lb. conductors to be looped in a short auxiliary cable, approximately 18 inches (457 mm.) in length. The smaller loading coil case is designed to mount seven loading coils of the No. 536 type, which can thus be jointed to the 200-lb. conductors through the auxiliary cable.

The dimensions of the large loading coil case are $44\frac{1}{8}$ inches (1,120 mm.) high to the top of the case; $25\frac{1}{4}$ inches (640 mm.) maximum diameter; the weight of the case being 1,500 lbs. (675 kg.). Fig. 7 shows the method used in lowering the loading coil case into position in the underground brick chambers built for their accommodation. Figs. 8 and 9 show the cable in process of being laid.

The chief electrical constants of the London-Birmingham cable are arranged in Table 2, the values being expressed, for ready reference, in British as well as metric units.

It may be remarked here, that the attenuation constant of the loaded 300-lb. conductor circuit is considerably lower in value than that of a non-loaded aerial wire circuit of the same diameter. In fact the attenuation constant of the loaded 300-lb. conductor circuit is only about 3 per cent. higher than that of a 400-lb. (4.02 mm. conductor, weighing 112.4 kg. per km.) non-loaded aerial circuit.



FIG. 9.

Type of Circuit.	Diameter of Conductor.		Attenuation Constant	
	Inch.	Min.	per Mile.	per Km.
Loaded 300-lb. cable	.137	3.48	.00408	.00253
Non-loaded 300-lb. aerial ... ..	.137	3.48	.00491	.00304
Non-loaded 400-lb. aerial ... ..	.158	4.02	.00396	.00246

So far as the attenuation constant of a loaded circuit may be regarded as a measure of its efficiency, there is no doubt that the 300-lb. conductor circuits in the London-Birmingham cable form the most efficient circuits yet included in any telephone cable. It is interesting to note that, had the 300-lb. superposed circuits been loaded with coils of an efficiency corresponding to that of the No. 545 loading coil, the circuit so produced would have had an attenuation constant approximately 10 per cent. lower than that of non-loaded 400-lb. conductor aerial circuits.

The success achieved, points to the possibility of utilising still larger-sized conductors in future long distance telephone cables.

Note.—Since this article was written, a summary of the official tests upon the London-Birmingham cable has been published in the *Post Office Electrical Engineers' Journal*, Vol. 8, Part 3, Oct. 1915.

NOTES FROM A TELEGRAPH OFFICER'S DIARY, 1868-73.

PRESS CHARGES NEARLY FIFTY YEARS AGO.

By W. H. GUNSTON.

A DIARY kept by an officer of the Electric Telegraph Company in the late 'sixties and early 'seventies, by the kindness of Mr. Newlands, has lately come into our hands. It deals chiefly with the arrangements for supplying the Press with reports of important political speeches in those far-off days, and is full of interest for telegraph men. The first entries of the kind are:—

Jany. 22nd.—*Conservative Banquet at B.S.*

E.T.Co. carried full report to LV. on 3 wires (4 col's recd. in 3 hours), and to MR. and EH. Y.Q. on 2 wires—also sent summary (recd. from Mage.) to Gt. Westn. Stations *only*. Magnetic sent summary from BS. to Ldn., LV. & MR. supplying their usual news Stations & handing Copy to E.T.Co. & U.K. at MR. for their usual news Stations.

U.K.Co. carried special Report to MR. for Guardian & Courier from BS.

The L'pool Papers did not take our report.

Receipt from Ldn. Press	...	...	£87	3	0
EH. Scotsman, & Courant 4836 wds. 2/- for 40 wds.	...	...	19	6	6
MR. Courier & Guardian 4991 wds. 1/6 for 40 wds.	...	...	11	14	6
„ Examiner 4836 wds. 1/6—40 wds.	...	...	11	3	6
			£129	7	6

Feb. 4th.—*Bright at B'ham.*

E.T.Co. carried full report to Ldn. and EH. for Scotsman & Courant—summary to MR., LV. & NG.—& handed copy to Mage. LV. supplied summary to Gt. Western Stations & to Mage. LV. MR. handed Copy summary to U.K.

Magnetic carried summary to Ldn. for Ldn. Press *only*—& sent report to Shemeld Daily Telegraph.

U.K.Co. sent special report from BM. to MR. for Guardian Courier & Examiner & to Leeds for Yorkshire Post & Mercury.

Receipt from Ldn. Press	...	...	£110	5	0
Edinr., Courant & Scotsman 8466 wds. at 2/- 40 wds.	...	...	30	12	10
MR. Courier, Examiner, & Guardian 9381 wds.	...	...	17	12	0
1/- 40 wds.	...	...	14	13	2
LS. Mercury & Yorkshire Post 9381 wds. 1/- 40 wds.	...	...	10	12	0
SF. Daily Telegraph 8467 wds. 1/- 40 wds.	...	...	

Total £183 15 0

Mr. J. H. Couldrey, of the Intelligence Department, Central Telegraph Office, to whom we are indebted for the opportunity of making these extracts, makes the following comment on this entry:—“Allow 7 London papers in the foregoing ‘London Press’ and we have 15 addresses. Take the 15 addresses and the maximum number of words at present rates, the charge for the report would be £15 13s. 4d. . . . The usual charges seem

to have been 2s. for 40 words for Scotland and Newcastle, and 1s. for 40 words for England (Manchester, &c.). . . . There were no news associations at that time, but the (Telegraph) companies sent out reporters to special events.” The following entry illustrates these remarks:—

Sept. 13th.—*Master Cutlers Feast at Sheffield.*

2 Reporters sent from London. Length of Report 1½ Col. (3126 wds.) Full report to LV. on 1 wire by E.T.Co. & to NT. & EH. Y.Q. on 1 wire Summary sent to LV. & MR. Copy of summary to Mage. at LV. & to U.K. at MR. Electric LV. supplied Gt. Westn. Stations & BM., BM. sent to NG.

Mage.—Found 1 wire for special report for Leeds Mercury & Manchester Guardian.

U.K.Co.—Found 1 wire for MR. Examiner.

Receipts from Ldn. Press	...	...	£27	19	1
„ „ *EH. Scotsman 1/6 for 40 wds.	...	...	7	19	0
„ „ *NT. Chronicle „ „ „	...	...	7	19	0
			£43	17	1

*£2.2.—each charged for Reporter. The usual charges for Scotland and Newcastle were apparently reduced to 1/6 on this occasion because only a single wire was used to serve the two towns.

This, at present rates would cos £3 14s. 8d. ! It should be observed that copy rates did not apply except when the additional addresses where at the same town.

These entries are of great interest as showing both the volume and the field covered by telegraphic reporting for the press in the days of the Companies, and the channels through which various towns were then served. Telegraph men will have no difficulty in understanding the codes, but, for the benefit of others, we may say that LV = Liverpool, MR = Manchester, EH = Edinburgh, NG = Nottingham, NT = Newcastle, BM = Birmingham, and LS = Leeds. Mage stands for the Magnetic Telegraph Company, and U.K. for the United Kingdom Telegraph Company. YQ is a line serving two or more places. Entries for Oct. 12, 14, 20, 21 and 23 show that Mr. Gladstone was at Warrington, Liverpool, Leigh, Southport and Wigan on those dates. The general election of 1868 was then in progress, and Gladstone was, no doubt, engaged in a great electioneering campaign in South Lancashire. Similarly, in October and November, we have a *resumé* of the telegraphic press arrangements for John Bright, three times at Birmingham and twice at Edinburgh.

After 1868 the notes cease until the autumn of 1870, by which time the Transfer to the Post Office had taken place. From 1870 to 1873, they deal mostly with internal arrangements in the Press Department of the Post Office, with the routing of traffic, and the addition of fresh towns to the list.

Notes of bye-elections, Derby day and other big race days, shipping intelligence, and of the visit of the Shah, are amongst the entries of 1873. The diary ceases in the January of the following year. By this time of course the greatly reduced press rates were in operation, and we find almost every public event of importance dealt with by the Intelligence Department. It is interesting to remark on the number of words allotted to the reports of speeches of various politicians and to speculate whether they should be taken as a gauge of their merit or of their popularity. For instance—Disraeli at Glasgow is given 1,500 words, Shaw Lefevre at Reading 300, Burt at Morpeth 470, “M.P.’s” at Wigan (unnamed, and taken *en bloc*) 250 words, “M.P.’s” at Salford (ditto) 220, whilst Archbishops and Bishops get 100 to 200 words. In most cases these reports went to about 30 to 35 papers. No doubt some instructive comparisons between the *pre*-1870 and the *post*-1870 periods could be made, as they will be made between the *pre* 1916 and *post* 1916 periods.

COVERS FOR BINDING THE “JOURNAL.”

COVERS for binding the JOURNAL, as announced in our September issue, can now be obtained at 1s. 6d. each. Subscribers sending the twelve issues for 1914-15 to the Manager Editor, G.P.O. North, London, can have their volumes bound up at an inclusive charge of 2s. 6d. each. Postage will be charged on single copies, but not on parcels of six or more volumes.

THE PROTECTION OF TELEPHONE OPERATORS IN NEW YORK.

An article in *Telephony* of New York by Dr. L. F. Fuld, describes the steps taken by the New York Telephony Company for the protection of its operators, and for provision of comforts for them when on duty. As to the care exercised in the selection of telephonists, he says:

"In selecting its telephone operators the New York Telephone Company is scrupulously careful to select only young women of robust health and of good family. Good health in an employee is necessary for the efficiency of the corporation as well as for the happiness of the individual employee. Good character and home influences, on the other hand, are insisted upon by the telephone company primarily for the purpose of protecting its other employees from undesirable influences. This solicitude for the moral welfare of its employees continues throughout their period of employment.

"At each telephone exchange the company employs a matron—a middle-aged woman who is neither of the domestic type nor of the sociological investigator type. She is rather a woman of the motherly type, quick to gain and retain the confidence of the young women employees. She learns their views of life and their associations at home and during their hours of leisure. She gives them advice and assistance, not as a superior officer but as a friend and counsellor. She is loved by the employees as the typification of the mother spirit and serves the company by keeping it informed regarding the moral attitude of its employees. When a girl leaves her home without a good reason, or when she shows by her dress or manner in the office that her views of life or her manner of living have changed, someone in the exchange will suggest to her that perhaps it would be desirable for her to devote her time to less confining work than that of telephone operating. With a minimum of friction her resignation is secured and the other employees are protected from contamination.

"To provide a continuous public service some of the telephone operators are obliged to work at night. Women workers at night are peculiarly subject to insult in our American cities because their presence on the street at night is frequently misinterpreted. To protect its operators from such annoyance the corporation arranges to have the girls go home in groups, and if necessary it furnishes them with an escort. Recently a crowd of four rowdies insisted upon congregating in front of the exchanges and speaking to the girls when they left the building. A representative of the company was sent quietly to the captain of the police precinct in which the exchange was located. It was explained to this official that no notoriety was desired, but that this annoyance was to be stopped quickly and effectively. On the next evening four stalwart policemen in plain clothes were on hand and explained to these rowdies in the language and in the manner in which they best understood, the message that such conduct would be tolerated neither by the telephone company nor by the city authorities. Although some of the rowdies suffered severely from this lesson in gentlemanly conduct and behaviour, no complaint was made by them. Rowdies are generally cowards."

The provision for the comfort of operators when off duty is on similar lines to that made in large exchanges in this country. With reference to bad language on the part of subscribers, the author says:

"When a subscriber swears at a telephone operator this does not interfere in the least with the efficiency of the corporation's service. It is an insult to the employee of the corporation, but all of the corporation's employees are taught to accept abuse received in the line of duty without undue complaint, or harsh retorts. When a young woman employee is insulted in this way, however, the New York Telephone Company takes energetic measures to protect her because she is a woman.

"A representative of the company who is mild-mannered but astute visits the offending subscriber. He introduces himself by explaining that the purpose of his visit is more disagreeable to the representative of the company than it is to the subscriber. He suggests to the subscriber that it was only thoughtlessness

which caused him to forget himself. Perhaps he did not think of it that he was swearing at a woman. The representative suggests that whenever the subscriber wishes to swear because of trouble with the telephone service, he should first call for the manager of the telephone exchange who is a man. He may then swear at the manager. The representative of the Company calls the subscriber's attention to the fact that the manager of his exchange is a particularly quiet man who has never been known to swear, excepting once when he did swear. And by the way, he could swear very well when he started. The subscriber usually digests these courteous suggestions and promises to bear them in mind.

"Sometimes a subscriber is obstinate, and says that he will swear at the operator whenever he pleases. In such a case the representative of the Company says that if he repeats the offence his telephone service will be cut off. The subscriber may doubt the power of the mild-mannered representative to carry out such a threat, and may even suggest that the telephone company will be liable to respond in damages for such an interference with the subscriber's service. The representative will explain that he has the power of stepping to any telephone and stopping the subscriber's service in five minutes, and that no court will compel the telephone company to pay the subscriber substantial damages for the interruption of his service if it is shown to the court that it was cut off to protect the company's young women employees from the subscriber's abusive language."



ECONOMY.

"By the way, could you think of anyone else we could send a wire to? The price is going up soon."

(Reproduced by the special permission of the Proprietors of PUNCH.)

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising { MR. JOHN LEE.
Committee - - { MR. J. W. WISSENDEN.
Managing Editor - - MR. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

NOVEMBER, 1915.

[No. 14.]

TELEGRAPH CHARGES.

ON Oct. 14 the House of Commons discussed telegraph charges. It was certainly a more encouraging discussion than that which, in 1883, heralded the sixpenny tariff, though it is significant that not a single member mentioned the poor; truly the Victorian tradition is dead. In fact the only criticism of the ninepenny tariff was the suggestion that the number of words be increased to fifteen, which, as the Assistant Postmaster-General said, would be an unremunerative tariff. On the subject of Press telegrams many claims were made. Naturally we sympathise with journalists, but we should have thought that some of the claimants would have reflected that reports of Parliament have become a little attenuated of recent years, and that they did not wait for the war before showing the shrinking tendency. "I do not know," said Colonel Lawson, "whether hon. Members know that there is a special section occupied in reporting their speeches in the Press Gallery here in a special manner for special newspapers." We have sought these special reports diligently and with care. Even the *Times* gives only fragments of the speeches; and our northern brethren in searching the *Daily News* will find of this debate only Mr. Samuel's speech. Some of the provincial papers gave the more striking passages, but not one of them supplied what could be called a "full report." We have tried to fill the void by extracts from the Official Report, but in spite of the fact that there were other matters of importance clamouring for first place in the newspapers we confess to a feeling of disappointment. It was an instructive debate; it showed us that the public depends upon our craft more directly perhaps than it realises. We have Sir G. Toulmin's authority for believing that the proposed increase in the Press tariff "would have lowered the status of the whole community served by the provincial Press." Henceforward, therefore, we shall raise our heads.

So, the flimsies and the clips and the carbonics remain. They are old friends, indeed, and we should grieve over their departure. But Mr. Denniss gave us a shock. "There is a certain company of engineering and Government contractors who have been in communication with the right hon. gentleman, and who have expressed their willingness to undertake the whole of the news traffic of the whole country at existing rates and then to do the work, they say, even more expeditiously than the Post Office." Years ago Lord Salisbury delivered a most important speech at Waterfoot in Lancashire. The only accommodation which could be found for the temporary telegraph office was in the back room of a draper's shop. And here the telegraphists toiled and spun, sitting on bales of calico and on boxes of what (we understand) are called "dry" goods. At least they were dry until one of the shelves gave way and the batteries poured their faithful dew on calicoes and serges, and the humming Wheatstone was shocked into silence. Such an event stands separate and lonely in telegraph history. Speeches have been telegraphed from all sorts of distant corners, at short notice, and without damping catastrophes. We look forward with joy to the day when private enterprise will do it more successfully: when amply-equipped telegraph offices will arise with the haste of Jonah's gourd; when shelves will never surrender; when oratory will come into its very own, for all this is essential to the transit of "the whole of the news traffic of the whole country."

It is chastening to the soul to read this debate. Either we are selfish people who are "the first to say that the benefit ought to go to them and to nobody else," or we are people who know nothing about our business. "The Retrenchment Committee came to their decision without hearing anybody but the officials. They made no enquiry whatever amongst those who would be affected, and who knew something about it." Thus spoke Sir T. Whitaker. It is a sad fate to be an official, but long experience has taught the official to bear this kind of criticism with due geniality, for he knows that, in spite of a cheap Press telegraph tariff, it will not generally be reported. We do not say that the Press tariff should be raised. It is a question which, at the moment, depends upon national considerations. But we do say that the question might have been discussed with something more of generous appreciation of a great service, including men and women of all types of mind, with various capabilities, which they have placed, during a time of stress, at the service of their country.

THE PROTECTION OF TELEPHONISTS.

AN article which we reprint from the New York journal *Telephony* describes the care taken by the New York Telephone Company in the selection of its operators, the provision made for their comfort when off duty and the steps taken to protect them from insult. These provisions are hailed by the author as an unsurpassed example of "chivalry" in business life, although most of them present no particular element of novelty in modern telephone administration. We are not unfamiliar—at least in England—with the matron who, besides exercising discretion in the choice of suitable candidates, deals with questions affecting the health, feeding and accommodation of telephonists. The lady described as "the typification of the mother spirit," who "keeps the company informed regarding the moral attitude of

its employees" is, however, new to us. We cannot help thinking that she must be a person of prodigious and almost superhuman discernment and tact if her office is not to be rather mischievous than helpful. We do not underrate the immense importance of restraining or excluding undesirable elements in all large aggregations of adolescents who are daily thrown in close companionship one with another. It is a sociological question of the first magnitude and of extreme delicacy; it is a problem difficult of solution in schools, and how much more so in business communities where those in authority have slenderer rights of tutelage. It is easy to discharge or expel the proven bad character, but who shall say when it is justifiable to discharge a person who looks as if she might, could, would or should be bad? "When a girl leaves her home without a good reason," says the author of the article, "or when she shows by her dress or manner in the office that her views of life or her manner of living have changed, someone in the exchange will suggest to her that perhaps it would be desirable for her to devote her time to less confining work than that of telephone operating. With a minimum of friction her resignation is secured and the other employees are protected from contamination." It seems to us as if such endeavours to protect employees from contamination might be fraught with grave risks both from the moral and commercial standpoint. In the first place can it be easy to obtain an ample supply of matrons so gifted with exquisite sympathy, largeness of mind, knowledge of the world and intimate knowledge of the sociology of large cities that they are able to judge, either by observation or by insinuating themselves into the confidence of girls, that their "views of life" and "manner of living" render them unfit companions for their colleagues? Does it not require an incomparable judge to decide whether a subtle and secretive character does not often hide an infinitely worse nature than a frankly bold but innocuous type? And again, is it morally justifiable to turn a girl away from honourable employment even "with a minimum of friction" to "less confining work" on the suspicion that she is somewhat frivolous, without a thought whither you are sending her? From the commercial side is it good business to get rid of an expert and satisfactory telephonist because the "typification of the mother spirit" considers that she affects a style of hat too exuberantly feathered, a lively taste in perfumes, or an amiable foible for powder? Again, it is notorious that the high spirited who incur rebuke for unimportant acts of waywardness are often the most intelligent and capable. Women, moreover, especially resent any sort of sumptuary laws, and it was regulations of that type which caused the only serious strike which we remember to have occurred in the London exchanges.

Whilst we realise the importance of maintaining a high tone or standard for an exchange, and the desirability of removing harmful influences, we believe that the only satisfactory steps which can be taken in this direction are the selection of girls of a good class and the expulsion of proven undesirables. The first step is already taken; occasions for the second are almost unknown. The average girl coming from a good home in the large city is able to be her own censor; she has been taught what influences to shun. It is difficult to legislate for a small minority without doing violence to the freedom of a great well-conducted majority,

and there is something especially repugnant to Englishmen in a form of "protection" which consists in reporting to the administration the "moral attitude" of employees as deduced from information extracted from them as a "friend and counsellor."

THE NEW STATUTORY TELEPHONE REGULATIONS.

OUR readers may be astonished to learn that the telegraph and postal changes mentioned in the recent Budget statement could not be brought into operation on Oct. 1 because authority by statute was necessary; whereas the telephone changes could be enforced as from that date because statutory authority only was necessary. The distinction seems at first sight to be insignificant; but the fact is that the former required the authority of an Act of Parliament, while the latter merely needed an amendment of the Statutory Telephone Regulations, 1910, in which—and not in an Act of Parliament—the pre-existing trunk and call office charges were laid down. Statutory regulations can of course amend statutory regulations, but cannot override an Act of Parliament.

The Statutory Telephone Regulations, 1915, differ from the existing ones in the following respects, viz. :—

They include the increased rates of charge in respect of the use of the trunk wires and of call offices; they apply to the international telephone service as well as to the inland service; and they embody the concessions by which quarter or reduced fees for unsuccessful trunk calls were abolished, the charge for a six minutes' trunk call is reduced when only three minutes is used, and contracts at reduced rates are available for the regular daily use of the trunk wires during the less busy hours of the day. They also enable the Postmaster-General to withdraw the service totally or partially in case of emergency and to prohibit the use of foreign languages over the telephone system.

But to the operating staff, perhaps the most important alteration is the increased power which they bestow for dealing with subscribers who use offensive language to the women operators. The Post Office is, of course, bound to protect its female staff from offensive abuse. Unfortunately there is a type of subscriber—relatively few of which are Britishers—who take advantage of the telephone service to use expressions and language to women which they would not dare to use face to face. They appreciate the secrecy of the telephone system and apparently consider themselves immune from punishment, because they assume that the woman insulted will be loth to report the matter. Indeed, they generally deny or endeavour to justify the use of bad language when remonstrated with by a male officer. In order to prevent any further annoyance from such creatures, power has been taken to cut off communication at once in such cases, and to prevent the further use of the telephone system until a satisfactory assurance is given that the offence will not be repeated. As a nation we are not perhaps so phlegmatic as to avoid altogether vulgar abuse or strong exclamations of annoyance when aroused, and most telephonists are prepared to make allowances for the natural irritation caused by the failure of an important call. They may rest assured, however, that Headquarters will not fail to evoke these powers in order to protect them against offensive language or constantly recurrent abuse.

HIC ET UBIQUE.

DURING a recent air raid on the East Coast Mrs. MAY BURCH, a caretaker operator at a small exchange, remained at her post and dealt with the heavy traffic resulting from the raid, although bombs were exploding in the immediate vicinity.

WHILST the London Press has, at the moment, a kind word for the Telephone Service, Plymouth is moved to wrath.

"London, the pivot of international business," says the *Evening Standard*, "and the most complex telephone area, with the exception of New York, in the world, now has the finest telephone service in the Eastern Continents. It has, moreover, achieved equality with New York."

To-day's figures for London give the remarkable return of an average of 4.2 seconds per call. That is to say, the millions of callers per week have to wait only about four ticks of the clock before opening conversation. New York has now to look to its laurels, for London is still improving."

Electrical Industries also is full of praise for the way in which the London Telephone Service investigates all complaints made through the Press, and even commends the "energy and skill" which the Post Office displays in the commercial development of its telephone business. But the *Western Daily Mercury* thinks that one of the worst features of the Budget is the plan for making telephones more costly, and, in its righteous indignation, finds the service one of the least efficient in the world. We wonder if the *Daily Mercury* could cite four or five of the supposedly numerous systems which are better, and give any satisfying data to prove their contention.

The *Times* of Oct. 1 records a successful experiment by the U.S.A. Navy Department with a wireless telephone from Arlington, Virginia, to Mare Island, California, a distance of 2,500 miles, and another by the American Telegraph & Telephone Co. between the Atlantic seaboard and Honolulu, a distance of 4,600 miles. The *Times* also recalls Mr. Godfrey Isaacs' statement last July that Mr. Marconi contemplated being able to telephone to New York as soon as he had made a few mechanical arrangements at the Carnarvon station. The *New York Nation* says on the subject:

Less than six months ago the wires carried the first uninterrupted telephone conversation between New York and San Francisco; on Wednesday of last week wireless speech was transmitted between the Naval station at Arlington, Va., and Mare Island, Cal., a distance of 2,500 miles, and then, to make the wonder even greater, between Washington and Pearl Harbour, Hawaii, a distance of 4,600 miles. Since communication was established by wireless telegraphy between Europe and America in 1907, it has been a foregone conclusion that wireless telephony would soon cover equal distances. The achievement which Secretary Daniels has announced, however, comes with startling suddenness, for we have heard little of the experiments on a smaller scale which would supposedly precede it. What the development of wireless telephony will be, only the future can show, and it will undoubtedly be great. But there can be no tendency to repeat the mistake of a decade ago, when men talked of wireless telegraphy as bound to send all our network of copper wires to the scrap heap. Like Marconi's invention, wireless telephony will be a supplement to, not a substitute for, the vast machinery of wire telephony and telegraphy which the world has built up, and an extension of the range and usefulness of the wire systems. Over the oceans, lakes and deserts, and other regions where it is impossible to string wires, it should have an immense value. It is predicted that apparatus will at once be devised to enable motor-boats, yachts and coastwise steamships to communicate with the shore, and that new efforts will be put forth to conquer the atmospheric disturbances which have interfered so much with all wireless communication. Its rivalry with wireless telegraphy will probably be much the same as the rivalry between the old telephone and telegraph.

"They are teaching foreign languages on the telephone now, it seems," says *Daily Sketch*. "This is what I saw in a shop window not far from Fleet Street yesterday afternoon:—'Ten minutes a day for six weeks, and you can master a foreign tongue.' Well, the telephone has been responsible for more 'bad' language than any other modern invention."

Having regard to the restriction of the use of foreign languages on the telephone, it would seem that the "tale" in the last sentence was what "wagged the dog."

"Sentiment among the telegraph profession," says the *Telegraph and Telephone Age*, of New York, "in this country against promiscuous gift-making is somewhat pronounced, but in England, especially in London, it seems to be very much in fashion. A recent issue of a leading telegraph and telephone journal of London contains a list of changes in the London and Provincial telephone staffs and it would appear that it must be a burdensome drain

upon those remaining in harness to be called upon so frequently to contribute towards a fund to make a present to some retiring colleague. Those leaving the service are mostly women and the most frequent cause of retirement is marriage."

Our contemporary, perhaps, does not realise that the practice is not confined to the telegraph profession in this country. There are few offices or commercial establishments where members of the staff departing either from the single state or from business life are not the recipients of some token of the good will of the colleagues. Where owing to the largeness of the staff the presentations are comparatively frequent the amount of each individual contribution is correspondingly trifling. Official discouragement of this long-standing practice has had no effect upon it.

9d.

Sing a song of ninepence, threepence more, you see
Four and twenty little words, costing one and three,
If replies are paid for when you are in a fix,
Four and twenty little words then cost one-and six.
The girl behind the barrier gathers in the money,
"The sender will affix the stamp" and find the taste like honey,
A million deficit becomes a profit, then a
Benevolent Post Office will send it to McKenna.

J. L.

A NEW HOPE FOR TELEGRAPHS.

NOTHING is more disheartening than to be set an absolutely impossible task. Given but the faintest glimmer of a prospect of success, and the call for a forlorn hope is never made in vain; how often and how gloriously has this been proved during the present war! But to be set a task which cannot possibly be fulfilled takes the heart out of the keenest.

Confronted therefore with the deficit of £1,200,000 on the year's working which appears in the latest published account, even the most optimistic members of the Telegraph Service must have despaired of ever making the Service a financial success, unless some radical change in conditions were introduced. This deficit has formed the text of many a journalistic homily on the folly of expecting a Government Department to manage a national service successfully, and to read these homilies one would think that the history of Telegraphs under Post Office management was the story of one disgraceful procession from bad to worse. Nothing is known by the writers of these articles, and too little is known by the members of the Service, of the brave struggle which Telegraphs have made under adverse circumstances. Handicapped at the beginning by a capital expenditure of over £10,000,000 for plant not worth more than £3,500,000, and by concessions to the Press which now involve a loss of more than £200,000 a year, forced later to carry messages at the impossible rate of 6d., subjected to the competition of Telephones, which brought development to a standstill and captured a great part of the short-distance traffic, it is no wonder that the Telegraph Service has appeared to the superficial eye financially an absolute failure.

There are, however, one or two considerations which go to show that, even though apparently so hopelessly overwhelmed, the Service has made a brave struggle against the tide. Take first the question of staff costs. Superficially this is one of the blackest spots, just the place where, according to the latest theories of Zeppelin tactics, the bombs of criticism should be dropped. For the simple truth is that the whole of the revenue goes in salaries and wages, leaving nothing for engineering materials, interest on capital, renewals or depreciation of plant, pension liability, accommodation and miscellaneous expenses. The average revenue per telegram is slightly under 7½d. and the staff costs are nearly 8d. (The other items of expenditure bring the total cost up to 11d. so that there is a loss of practically 3½d. on each telegram.)

Where then is there room for anything but mortification and despair on the part of those responsible for the Telegraph Service? The answer is, that in spite of large increases in wages, the staff cost per telegram to-day is no more than it was 30 years

ago; the difference is so slight as to be negligible. Yet, since 1885, when 6d. telegrams were introduced, the expenditure on wages per person employed has increased by an average of 40 per cent. This increase is mainly due to the several revisions which have taken place in the interval, but partly also to the fact that, the business being now practically stationary, the flow of new intrants has been checked, and the staff is on the whole older than it was in 1885, and therefore higher up the wages scale. It is true that the average telegram is shorter than in the days of one shilling for twenty words, and therefore gives less work, but this factor is not sufficient to neutralise the increase of 40 per cent. in the rate of wages. The explanation must be sought in improved methods of working and in the adoption of improved forms of apparatus. In other words it is due to good management, to initiative and enterprise, which we are so often told will be sought in vain in the Telegraph Service.

Let us turn now to the set-back which Telegraphs have received from Telephones and see how the elder Service has grappled with the situation. Here one is getting into a region where hot water may be encountered, and one must go cautiously. Is it not the mission of this journal to weld the two Services into one and to assure us all that any apparent conflict of interests disappeared with the invention of the blessed if hideous word "phonogram"? But, however much the editors may wish to preach peace and harmony, they cannot alter the fact that Telephones have stopped the expansion of Telegraphs and particularly have robbed them of a great deal of the short-distance traffic, which is naturally the less expensive traffic. Now, how have Telegraphs borne themselves under the attack? Here again they have done their best to make up leeway, and the figures show that they have adjusted themselves to the new conditions in a remarkable manner. In spite of the average telegram having to go over a longer distance than used to be the case, the number of re-transmissions is on an average no greater than it was before the development of Telephones. The obvious conclusion to be drawn is that again, by improved traffic management and by such devices as intercommunication switches, the Telegraph Service has kept its head up stream.

Yet in spite of all, the financial position is that, as stated above, a telegram costs 11d. and brings in a revenue of only 7½d., and with so great a difference between the two sides of the account it has been hopeless to think of putting the balance on the right side. Now, however, a new hope appears. The minimum charge for an ordinary inland telegram is to be 9d., and the loss on Press telegrams is to be reduced. With a minimum of ninepence it is to be expected that a telegram will on an average bring in at least tenpence; for although, given time and the will, wonders may be done in the way of compressing telegrams, there are limits to such parsimonious ingenuity, and fortunately, moreover, there are impatient people and reckless people. Since, therefore, the sixpenny telegram brings in nearly sevenpence-halfpenny, the ninepenny telegram may confidently be relied upon to bring in tenpence. Here then is a great opportunity for the Telegraph Service. With an assured income of tenpence in prospect as against the present expenditure of elevenpence, a vision of possible solvency at length appears. A Service which has made so magnificent a fight against such desperate odds is surely capable, with this new stimulus, of effecting further economies, and so marching to victory; and it will be a proud day when, except for the loss still remaining on Press telegrams, the deficit disappears and the Parliamentary White Paper on Telegraph Accounts is indeed a clean sheet.

A. J. W.

PLYMOUTH: AMALGAMATION OF TRUNK AND LOCAL EXCHANGES.

On Oct. 10 the trunk circuits at Plymouth were transferred from the H.P.O. to the local exchange. This involved the bringing into force of a certain amount of trunk control at the exchanges in the Plymouth area. All exchanges in the Plymouth telephone district now exercise a limited amount of trunk control, and most of the trunk circuits are now worked on a "junction" or "no-delay" basis. The priority of trunk over local calls was abandoned on Oct. 11. All trunk exchanges in the Plymouth district have now been amalgamated with the local exchanges.

TELEGRAPHIC MEMORABLIA.

FARRINGTON ROAD, LONDON, invariably contains some interesting odds and ends reminiscent of the Post Office Telegraph and Telephone Departments, in the shape of obsolete or disused apparatus. Never yet has it been possible to rummage over its stalls and semi-booths without sighting, amidst the various derelict electrical, optical and mechanical *débris*, some object of peculiar interest to the Post Office, and at times even some link with pre-Government days.

The bookstalls of this market, a survival of ancient privileges, have also proved attractive to the young and impecunious would-be student of telegraphic mysteries. Not always with the best results, as this famous mart for second-hand goods is not a very frequent repository for up-to-date books on technical subjects at gutter prices.

However, when he has an odd ten minutes the book-lover can find the time slip all too easily away, especially should he linger near the tempting rows *en route* for St. Martin's le Grand! Quite recently an enthusiastic subscriber to this journal lighted upon a long-looked-for volume upon a subject far removed from either Posts, Telegraphs or Telephones. The writer of this column is only interested in the purchase of this precious volume to the extent that it has provided matter for a couple of paragraphs!—and enabled him to procure what he has sought for during the last ten or twelve years—namely, some pictorial record of the Baudot as it formerly appeared with its horizontal distributor and its helical metallic governor as formerly utilised by Professor Hughes in the telegraph instrument which bears his name.

Folded and creased in between the leaves of our friend's coveted volume were the fragments of a Parisian journal published in 1889 and known as *L'Exposition de Paris*. It was a weekly publication and its October number of the above year contained an article on "Le Pavillon des Postes et Télégraphes à l'exposition universelle," with a brief description of "Le Télégraphe Multiple Baudot" together with a woodcut engraving of the latter apparatus as then actually worked in the Paris C.T.O. in the Rue de Grenelle. This engraving is reproduced in the usual first class style now associated with the TELEGRAPH AND TELEPHONE JOURNAL, and should prove of more than ordinary interest to JOURNAL readers, especially as it represents practically the same office to-day except that traffic developments have since compelled a closer crowding of both apparatus and staff, together with the natural modifications of apparatus.

It will be noted that the relays, switches and connexion box, together with the usual Morse speaker, were then placed quite apart from the receivers and keyboards, while the "telephone" cadence had not then come into use, the "frappeur" being common to the old type of Baudot.

It is worthy of note that it was apparently just about this time that the vertical Baudot distributor was introduced, for although the horizontal type is shown in the picture and acknowledged by the exhibition writer to have then actually been in use in Paris and elsewhere, he adds: "*Depuis deux ans, M. Baudot a remplacé le régulateur hélicoïdal horizontal par un régulateur nouveau, disposé verticalement. Ce régulateur figure dans tous les appareils Baudot de l'Exposition actuelle.*"

Among these torn fragments of an ephemeral journal, which apparently formed the temporary bookmark to a volume absolutely unallied in subject and sympathy, there are one or two small items of passing interest to the telegraphic historian of to-day. In 1889 the source of power for the working of the telegraph lines passing through this one office was derived from 10,000 primary cells of the *Callaud* type in addition to a number of *Leclanché* pattern utilised for local telegraph circuits and for telephone purposes.

Then, strange to say, one reads the mention of duplex apparatus for Morse, Hughes, and Wheatstone (*sic*), the zeal for which (duplex) would appear to have faded somewhat until quite recently, at least so far as one is able to judge from observations made upon this side of the Channel, and from a few visits to some of the principal telegraph centres of France.

The fact that a quarter of a century ago the "frappeur"



UN POSTE DU TÉLÉGRAPHE MULTIPLE BAUDOT, AU BUREAU CENTRAL DES TÉLÉGRAPHES DE LA RUE DE GRENNELLE, À PARIS.

cadence keyboard should have been superseded by the "telephone" cadence which latter, after holding its own for about a couple of decades, is about to be superseded only by another form of "frappeur" cadence is a reversion to type worthy the note of a Darwinian student of inventions. Such an one might carry his observations into the literary sphere of Telegraphy and observe from these same French documents that, while the inventor's name was then spelt *without* the circumflex accent over the "o" and twentieth century French technical books insist on its use, thus "Baudôt," modern British writers and printers are consciously or unconsciously reverting to the model of the penultimate decade of the nineteenth century! Having, however, found a precedent for our anglicising of the French inventor's name, we may rest happier in banishing henceforth the awkward circumflex which the compositor cannot always find ready to hand in his case.

Autre chose.—When the mighty wooden cases with their deceptive fluted columns, crowned by their further deceptive Corinthian caps, were recently removed from the Provincial Gallery of the C.T.O., London, and disclosed the real source of strength which upheld the roof, an interesting press notice appeared affixed to one of the steel pillars. This notice made the announcement presaging the institution of the "tannergram," and it is curious that this piece of writing on the wall should have been brought to light by structural alterations in the very year which threatens the abolition of "twelve words for sixpence."

Speaking recently with a Post Office telegraph mechanic home on leave from the front, quite incidentally and without any comment, as though it were a matter of ordinary routine, he said: "Of course cables into the trenches have to be laid at night. The

last one we laid just before I came away was put down by midnight, and we mended it four times before 5 a.m. of the next morning owing to shells dropping on to or near it."

Thus Post Office men "over yonder" are doing their bit with unconscionable heroism, while the women at home, as mentioned in last month's leaderette on the Zeppelin raids, are equally worthy of our race, but as Kingsley sings in one of his Saga translations:

"Where the women are heroes,
What must the *men* be like?"

Nevertheless, Mr. Editor, it hardly seemed necessary to accentuate the fact that "at an hour when most young ladies are safely in bed, &c.," the coming to office "involved getting up and *dressing* again"! The italics are those of yours with respectful apologies.

J. J. T.

[We understand that one brave girl did come on duty without her boots.—ED. "T. & T. J."]

CORRESPONDENCE.

EDITORIAL CRITICISM.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

I HEARTILY agree with Mr. J. L. McGrath in his letter published in your last issue.

If the Editor takes it on himself to sum up and direct his readers' judgment, surely it is not "cricket" to ignore two of the main points in Mr. Brown's arguments, conclusively prove to his own satisfaction that on a third point the Committee is right, and give as his opinion that Mr. Brown and his supporters are wrong.

The Editor likens himself to a judge, but must remember that the jury has seen the evidence and are, after all, the people who give the finding for or against. Let the jury speak.

R. KIRKWOOD.

Glasgow (Telephones), Oct. 14.

POSTAL AND TELEGRAPH RATES (STATUTORY LIMITS) BILL.

WE reprint in full from the *Parliamentary Debates* of Oct. 14, 1915, all the speeches or parts of speeches relating to telegraphs and telephones.

Order for Second Reading read.

Motion made, and Question proposed, "That the Bill be now read a second time."

The POSTMASTER-GENERAL (Mr. Herbert Samuel): The House will observe that the Bill does not include several of the proposals in reference to the postal and telegraphic charges that were made by the Chancellor of the Exchequer in his Budget speech. * * *

I do not think it necessary to go into any of the minor proposals of this Bill. I should like, however, to say a few words on the very considerable change which it is intended to effect in the charges for telegrams. The country generally has accepted without protest, under the existing circumstances, the increase in the telegraphic charge for ordinary twelve-word telegrams from 6d. to 9d.; but I do not think it would be proper for the Postmaster-General, when he proposes to Parliament a considerable change of this sort, to pass it by without some explanation as to the causes which have brought the finances of our national telegraph system to their present condition. The telegraph service, under State control, began badly from a financial point of view in 1870, when the plant of the companies was taken over by the State at a most excessive cost. Owing to the Parliamentary arrangements at that time not only was the value of the plant paid for, but heavy compensation was also paid to the company on account of the transfer, and very large sums were paid to employees of these companies in pensions and allowances. The State paid the companies a sum of no less than £10,000,000 in respect of the plant, the actual value of which was about £3,500,000. Ever since the telegraphic enterprise has been charged interest on that £10,000,000, amounting to about £270,000 a year, only one-third of which is in respect of actual asset value. In 1883 a private Member's Motion in this House was carried against the advice of the Minister of the day—as sometimes happened in those days—in favour of 6d. telegrams. A small majority of this House—I think it was sixty-eight against fifty—insisted on the reduction of the minimum charge of 1s. to 6d., and in 1883, in obedience to that Resolution, the Government of the day altered the charge from 1s. for twenty words, excluding the address, to 6d. for twelve words, including the address. The accounts then laid before Parliament showed ostensibly a profit being earned on the telegraphic business, but that profit was, in fact, barely enough to pay the interest on the debt which had been incurred through the purchase of the system of the companies, and the accounts were then framed upon a much less strict basis than is now adopted by the Post Office. For example, no charge was made for depreciation beyond the actual cost year by year for renewals. No regard was had for the certain future increase in pension charge, but the pension charge was simply stated at the cost of that time, and there were several other minor points which depart from the present practice.

If the telegraph accounts at that time had been framed on the same basis as now, the enterprise would then have shown a not inconsiderable loss. The Postmaster-General of that day estimated that a revenue per telegram would be realised of 10d. for twenty words. It was then estimated that the 3d. a word telegram probably would consist of twenty words, and bring in a revenue of 10d. As a matter of fact, the average telegram consists of fifteen words, bringing in 7½d., in other words, the revenue per telegram was 25 per cent. less than was estimated when it was introduced. If the original estimate had been realised we should have been receiving now in respect of telegrams an additional revenue of £750,000, against which would have to be set the comparatively small cost of transmitting the additional words for the longer telegrams that were estimated. The future expenditure that was estimated in 1885 was 8½d. per telegram, leaving a profit on that basis of 1½d. As a matter of fact, the expenditure per telegram is 11d., instead of 8½d., and the revenue is 7½d., instead of 10d. estimated, and there is consequently a loss on each telegram of 3½d. Since that time the wages of the operating staff have been very largely increased by successive steps, largely—perhaps mainly—in consequence of pressure from this House from time to time. The actual average pay, apart from overtime pay, Sunday pay, and pensions, of a London male telegraphist was 28s. 10d. in 1885. It is now 51s. 3d. I do not think that anyone can possibly defend a wage of 28s. 10d., and I am not suggesting that the present scale of wages is unduly high; but the fact has to be taken into account that these increases have been made, and, if an allowance is made for the numbers of the staff of the various classes, it is found that the average increased expenditure in respect of the wages of the operating staff has been in that period 40 per cent.—that is, comparing the year 1885 with the year 1913, and apart from all questions of war bonuses. The engineering staff also has had its wages considerably increased, and the total increased cost which may be attributed to increased labour expenditure amounts to another sum of £750,000 a year.

Further, the introduction and rapid spread of the telephone has had, naturally and inevitably, a great effect upon the telegraphic service and its finances. Of recent years the number of telegrams transmitted has remained much the same from year to year, but their character has been continually changing. Short-distance telegrams, which were remunerative telegrams, from one part of the town to another, involving only a single transmission, have been continually decreasing rapidly. The long-distance telegrams,

which involve several transmissions and the use of a much greater length of wire, and much more telegraph plant, have been increasing in number, and consequently the cost of transmitting the telegram per word each year becomes much greater. It will be obvious to the House that as short-distance remunerative telegrams have been replaced by telephone messages to a large extent, and long-distance telegrams have increased in number, the cost on the average of maintaining and managing the telegraph service must necessarily have increased. Further, for the sake of the convenience of the agriculture industry, and of residents in rural districts generally, great numbers of telegraph offices of an unremunerative character have been opened in the rural districts. It has been deliberately done as a matter of policy, and the loss which has occurred has been undertaken avowedly, and of set purpose, by the House. The addition of the 3-mile free delivery limit is now allowed, and it is obvious that to send a telegraph message a distance of 3 miles out and 3 miles back in respect of a telegram on which, perhaps, only 6d. has been received for all services, must be an exceedingly unremunerative operation.

Again, the Post Office of recent years, not with any financial purpose in view, but solely in order to improve the efficiency of the service, has entered upon a costly programme of underground lines. Fourteen hundred miles of underground cable have been laid in various parts of the country with a view of improving the transmission of telegrams, and especially freeing them from interruption owing to the breakdown of the wires. These underground lines cost no less than £1,200 a mile, and expenditure has been incurred under that head of £1,675,000, which, from a financial point of view, is little remunerative, but which has undoubtedly very much improved the efficiency of the service as a whole. Against all those factors has to be set only this one—that the average telegram is, as I have stated, fifteen words instead of twenty, and consequently the Post Office is relieved from the necessity of transmitting the additional five words for which estimate was made in 1885. We have, again, effected economy of administration somewhat through the use of machine telegraphs, which were very costly instruments to maintain, and we have undoubtedly in recent years very much improved the internal management of the Post Office telegraph system and increased the output.

The consequence—I think the Post Office is entitled to take some credit for it—is that in spite of the fact that wages have been so much increased, in spite of the fact that each telegram has to be transmitted a longer distance on the average, and in spite of the fact that we maintain unremunerative rural post offices, and have extended the free limit of delivery to 3 miles, the actual cost of operating is no higher than in 1885 on the average. The cost on the average then was 8d. to transmit each telegram. It costs on the average now just under 8d. to transmit each telegram, but the real cause of loss is due to the fact that the estimates framed in 1885 have not been realised, either in respect to revenue or in respect to expenditure. If one views the telegraphic accounts as a whole, and not the average of each telegram, it is found that we receive from the public in respect of telegrams, in round figures, £3,000,000 a year. This just covers the cost of salaries and wages, and leaves nothing over for maintenance, depreciation, interest, accommodation, and pensions. These items altogether amount to a total expenditure of about £1,200,000 a year, and that has been the loss hitherto on the telegraph service.

In those figures I have included, of course, the revenue from and expenditure upon Press telegrams. If 6d. for every twelve words was unremunerative it must be obvious that 1s. for every hundred words must be far more unremunerative, and particularly since the 1s. is only paid in respect of the first telegram of a batch, and that the Press has the privilege of sending at the rate of 2d. per hundred words by night and seventy-five words by day any number of additional copies of the same telegram to any number of additional addresses in different towns in any part of the country. A Press telegram is handed in at night, containing one hundred words, addressed to Newcastle, and a second copy of that telegram must be accepted by the Post Office, and addressed, perhaps, to Southampton for 2d. Nineteen-tenths of the Press telegrams are sent, as a matter of fact, at the copy rate, and the average receipts for Press telegrams, taking that fact into consideration, is 3d. per one hundred words by day and 4d. per one hundred words by night. The night rate is one hundred words for 1s. and the day rate seventy-five words for 1s., with 2d. copying rate in each case. As a matter of fact, the great bulk of Press telegrams is not sent by night, as is generally supposed to be the case. Sixty per cent. of the telegrams are sent at the day rate, between the hours of 9 a.m. and 6 p.m., and only the minority of telegrams are sent by night, when the wires are comparatively idle. A very considerable proportion of those telegrams sent on behalf of the Press are never published. It is, of course, very difficult for any Press organisation to be able to distribute precisely the amount of Press matter required by the newspapers. Unexpected news may come in, displacing telegrams that would otherwise have been used. They have to cater for the different tastes of different newspapers. A return was taken in some of our largest provincial offices in 1911, and that return showed that only 64 per cent. of the actual telegrams transmitted over the wires were published and 36 per cent. not published at all. The transmission of that 36 per cent. involves, of course, a heavy loss to the Post Office, as the revenue received for the transmission is far less than the cost.

Sir WILLIAM BYLES: They were all paid for.

Mr. HERBERT SAMUEL: Yes, but I would much rather not have them.

Sir W. BYLES: I thought the House might think that only 64 per cent. were paid for.

Mr. HERBERT SAMUEL: No, all transmitted over the wires, and consequently paid for, and the effect is that the Press pay roughly for 150 words for every 100 words published. I hope one method by which the Press may recoup itself for the extra burden caused by the increased charges may

be by economising in that direction, and securing that the number of telegrams transmitted shall approach more closely—I quite agree it cannot approach accurately—to the number used. Although the Post Office thereby loses some revenue, the service is an unremunerative one, and the loss of revenue leaves me quite cold. The Press, however, have been accustomed to these excessively cheap rates for a period of forty years, and great businesses have been built up on the strength of them. On a review of the whole circumstances the Government thought that it was not possible at the present time to attempt to make the Press telegraphic service remunerative. The charges which were proposed by the Retrenchment Committee, and which were mentioned by the Chancellor of the Exchequer in his Budget speech, are considered on review to impose on the Press a burden which, especially in the present time, it would be difficult for them to meet, and, consequently, I have been in close communication with accredited representatives of the Press and journalists' organisations. I have found that they recognise some increase in the Press rates is reasonable in the present condition of national finance, and, by agreement with them, I propose the scale of charges which hon. Members will find included in this Bill. They will add about 40 per cent. to the present revenue from the Press, after allowing for some diminution of traffic—really, an additional sum of about £60,000. The Press have represented very strongly that their position during the War is one of great difficulty, for, although the circulation of papers has increased, the advertisements, which to them are very important, have very largely declined, and, therefore, in order not to press them too hardily, it is proposed by this Bill that the new charges shall not come into operation until the end of the next period at which they make their normal contracts—after the 31st December next year, thus giving them rather more than a year's notice in order to adapt themselves to the new arrangement.

The consequence will be that from the new telegraph charges we shall derive the following additional sums:—From ordinary telegrams an increased revenue of £410,000 after allowing for some diminution of traffic, and from Press telegrams an increased revenue of £60,000. We hope to be able to effect owing to the diminution of traffic a saving of expenditure in a full year of about £70,000 in the near future, and we hope also that we may be able to make a much larger saving, perhaps amounting to as much as £200,000, when the effects of these charges are fully felt and when we have been able to adjust the staff to the new conditions of traffic. That will be a total from revenue and saving on expenditure of £740,000.

Further, I have been giving in recent years very close attention to the increased use of machine telegraphy, and to the economies that may be effected in that direction. When I had the honour of being Postmaster-General before I appointed a Departmental Committee under the chairmanship of the then Assistant Postmaster-General to make a more detailed inquiry, with expert advice, into the kind of machine which is most suited for the various classes of Post Office work. There are a number of rival machines on the market. That Committee is now about to report. Since then my right hon. Friend, who succeeded me as Postmaster-General, appointed a second Committee under the chairmanship of my hon. Friend the Member for Elgin and Nairn, which is going more closely into the question of the finances of the telegraphs, particularly with regard to machine telegraphy. That Committee will be able to act on the new Report which will be in their hands, and I hope they will be able to carry the process of Post Office economy by means of using machines which of recent years have been very greatly improved, to a much further point than has hitherto been possible.

I beg to present to the House this Bill for Second Reading. The Post Office has always prided itself on being able to give to the public a progressive reduction of rates with increased facilities, and during the four years of my previous tenure of office as Postmaster-General I had the privilege of being able to extend in many directions the facilities to the public—all of them of a character which were at the same time not remunerative to the Post Office. It is an unhappy moment for any Postmaster-General at any time to have to come to Parliament and ask for sanction for an increase of Post Office charges. In fact, I believe it is the case that since the penny post was introduced, over seventy years ago, there has been only one case in which any Post Office charge has been increased, and that was the abolition of the parcel post in 1871—a policy which was reversed a few years later in 1887. Otherwise the record of the Post Office has been an unbroken history of reductions of charges and increases of facilities. But in the present national circumstances the Chancellor of the Exchequer has been compelled, much against his will, to look to the Post Office for assistance in increasing the national revenue, and I trust that, in view of the difficulties of the time, the House will give its sanction to this Bill.

Sir T. WHITTAKER: * * * The additional charges which are to be made for Press telegrams are an increase of 80 per cent., which is a very substantial increase. I suggest that the Postmaster-General and his predecessor in making these inquiries into the use of labour-saving and more efficient machines are moving in the right direction. The right direction is to increase efficiency, to increase speed, and to get better services. I believe that the officials of the Post Office Department are very able men, and I do not think they ever showed their ability more than when they were approached by the Retrenchment Committee and when they switched the Committee off retrenchment and on to increased charges on the public. It was very ingenious and showed a very considerable amount of ability. I notice also that the Retrenchment Committee did not suggest because the agricultural post offices and agricultural telegrams do not pay that there should be an alteration there. They are obviously and clearly unremunerative. I contend that they ought to be continued. I do not think you can look at these services in detailed items. It is a national service, and you must take it as a whole. The postal service

in our large towns could be done by private enterprise at a great deal less cost, but in my judgment you must look at the service as a whole, and as a whole it is extremely well done, cheaply done, and well managed. I have indicated the directions in which, in my judgment, increased revenue might be obtained. You should get increased revenue through increased efficiency, and not through increased charges where they can be avoided. The present time is special, and it is quite reasonable that there should be some increase in the charges, but those now proposed, I venture to submit, are quite ample.

Mr. JAMES MASON: The right hon. Gentleman mentioned that one of the difficulties about the telegram was that in recent years the short-distance telegram, which cost the least to send, had decreased in number, whereas the long-distance telegram had proportionately increased. This, of course, is attributable to the introduction on a general scale of the telephone. If that is so, and it is undoubtedly the fact that a great deal of the short-distance work formerly done by telegram is now done by telephone, it would seem to be a reason for increasing the revenue derivable from the telephone. I do not know how that could be done, but there are a few directions in which an effort might be made to increase the revenue, such as the fixed rate of interest chargeable for machines. I merely throw out for some future occasion the suggestion of the possibility of deriving some further revenue from the telephone if it is the fact that the telephone absorbs a good deal of work which used to be done by the telegram. The right hon. Gentleman pointed out that the Press telegram rates were not to be put into force until December next year. That, of course, means that for the next fifteen months we are not to derive any increased revenue from that source, and, although I am sure there are excellent reasons for doing that, it is to be somewhat regretted that we have to wait so long for the result of this alteration. I would merely like, as I have no doubt the whole question is being decided by the right hon. Gentleman, to impress upon him the desirability before this matter has to be revised—and I have no doubt if the present condition of things continues long he may find it advisable to revise the postal rates again—of considering the possibility of some special charge on all packages, which I think perhaps would be a better way of increasing the revenue.

Mr. E. CECIL: The right hon. Gentleman the Member for the Spen Valley (Sir T. Whittaker) has made a very severe and I would say an almost bitter attack on the Retrenchment Committee. He is perfectly welcome, as far as I am concerned, to depreciate as much as he pleases any business capacity which he may think I have, but I think I am justified in pointing out that his criticism that the Committee did not consist of business men is not only a futile one, but is wholly untrue. * * * I quite agree that newspapers of more than 6 ozs. should be charged more than one halfpenny, and I am glad that the rate of Press telegrams has been raised. Nobody wants to be unfair to journalists or Press agencies, whose public services I, for one, gladly and warmly acknowledge, but in a time when there is a crying need for economy I doubt whether the nation should continue giving what is really an enormous subsidy, and something which is subversive of the principle that each Department should be run on a remunerative basis. I understand that that is the principle upon which my right hon. Friend wishes to act, and that is certainly the principle which has actuated all the recommendations of the Retrenchment Committee. The right hon. Gentleman said that these new rates for Press telegrams applied more particularly during the War, and they were not to begin until 31st December, 1916. I should be glad if we are able to conclude the War before that date, but whether that be so or not, I do not quite follow what the right hon. Gentleman really proposes. Supposing the War ended before that date, would the right hon. Gentleman bring in a Bill to restore the old rates, or is it proposed eventually, when peace conditions return, to see that Press telegrams are placed on a remunerative basis, and that the rates will be again revised after 31st December, 1916, to ensure that the principle to which I have referred is carried out. I commend these suggestions to my right hon. Friend.

Colonel HARRY LAWSON: In whatever light you look upon it, I think the House will be with me in saying that this is a melancholy little Bill. I doubt if it does much for retrenchment, and I am certain that it does a good deal that sins against efficiency. To those of us who have dabbled in past years, however ineffectually, in postal reforms, this is a very depressing and disheartening performance. When we have pressed for cheaper means of communication it is because we have thought that they have been essential to national welfare, the expansion of trade, and the growth of industry. I do not think that we have forgotten those maxims now; but, of course, we live in hard times, and I agree that the Postmaster-General is justified in doing all that he can to effect economies, providing that the loss of efficiency be not overmuch. It is not for me this afternoon to enter into general questions so much as to deal with those parts of the Bill in which the organisations with which I have something to do are particularly interested. I think the House should be quite sure of its ground in making changes in regard to the cost of Press telegrams. The history in this connexion is rather a curious one. The present arrangement was made forty-six years ago, and it was done more for the benefit of Members of this House than for the public generally.

The new charge is one which falls almost exclusively on the provincial Press. When the proposal was first made, I think hon. Members were a little mistaken and thought the Press generally would share the charge between them; but that is not so. It is really an addition to the working cost of provincial newspapers, and the reason the old arrangement was made was largely to enable speeches made in this House and by public men outside to be reported in the provinces. The effect, of course, will be that many of my hon. Friends will find they are no longer reported in the newspapers which circulate in their constituencies; and I am sure that will be a loss to the

constituencies, and some of my hon. Friends may think it a loss to them also. That is the way in which the economy will be effected, and I am certain that the revenue will not gain much. I am equally certain that the Postmaster-General's anticipations will be falsified. The economy will be made in curtailment what has been looked upon as a public service, and it is for the House to judge whether that is a desirable thing or not. Some people think the effect will be to curtail the volume of speeches made here to the national advantage. I do not know whether hon. Members know that there is a special section occupied in reporting their speeches in the Press Gallery here in a special manner for special newspapers. That is to say, speeches made here are supposed not to be of equal interest in all parts of the country, and therefore special reporters report them at greater length—I do not say at undue length—for consumption in the constituencies represented by hon. Members. I venture to think that that section of the Press Gallery will largely disappear under the new system, or at any rate their arrangements will have to be modified. I have no interest whatever in this matter, but it is really a curtailment of publicity of debate and of speech making, and the House must look upon it in that light. There is no doubt that it is in that direction that the Press agencies will effect a saving, and newspapers can only expect in that way to maintain their present rate of expenditure upon this part of their working organisation.

It is wrong to think that this was a favour shown to newspapers, because it was really a piece of extravagance—vicarious extravagance perhaps—imposed upon the country by hon. Members of this House who wished to be reported in their constituencies. That is the true and inward history of the arrangement made for Press telegrams. The House now professes to wish to bring it to a close. I notice the date on which the arrangement will come into operation is far removed from this, and perhaps before that time hon. Members may reconsider the question in the light of their own experience. Anyhow they will not experience the new charge until they have ascertained what the new conditions will be. As it stands, it cannot come into operation for virtually fifteen months. If a saving is made having the experience of past years behind us for guidance, does anybody imagine that the country will reap the benefit? Probably those who will reap the benefit will be the postal servants. From some lack of concentration and the inevitable slackness of management which characterises Government Departments, the Post Office has never been able to resist any organised movement for the increase of wages and remuneration, and I am certain the postal servants, who are admirably organised under very capable leadership, when they find that there is a saving made, will be the first to say that the benefit ought to go to them and to nobody else, and will point out very good reasons why that should be so. In fact, I believe myself that this difference in expenditure is a new appropriation in-aid of postal wages. Whether that turns out to be a prophecy which, like many others, may be falsified by the event, that is how the matter strikes me. I thought the House ought to know exactly how this new newspaper tax will act. It will not affect the Press generally. It is meant to be a burden on the provincial papers, but probably the provincial papers and the Press agencies who supply them will safeguard their interests by curtailing the reports of public speeches.

I am informed that in the drafting of the Bill there is a mistake in Clause 1, which makes it very doubtful whether there will not be an extra charge on all packets far in excess of what is intended. That is a matter of drafting which I am quite certain the right hon. Gentleman will see is set right when the Bill comes into Committee, because it is clearly not his intention to disturb existing arrangements to that extent. The right hon. Gentleman is wrong also in thinking that daily newspapers generally will be covered by the 6 ozs. rate. That is not so either. That is a matter of detail which on inquiry he will be able to set right, if he thinks it ought to be done in fairness and on the principle of equality as between different publications. For my part, I should have much preferred that this new tax, instead of being put on as a perpetual clog and load upon our national industries, had been specifically stated to be for the term of the War. In that respect I agree with the hon. Member for Aston Manor (Mr. E. Cecil) that a war tax and a war stamp would have been preferable to a permanent impost. It cannot be the wish of this House to fetter the means of communication so as to act in a way that will be detrimental to our national trade in the future. After all, competition will not only be keener, but, to use an American phrase, it will be more cut-throat then ever after the War. It will be a desperate affair to keep things going, and it cannot be sound to cripple national industry in such an essential as the means of communication if it can be avoided. In national economy that cannot be a right principle and it cannot be an expedient principle. I believe that is done to some extent by this Bill, and if we could be assured that to meet the necessities of the War these taxes were imposed for the period of the War and until the present trouble be overpassed, personally I should prefer it, and I think it would be not only more workable but more likely to be successful in its results. These are the points to which I wish to draw the right hon. Gentleman's attention. As to the charges in regard to the weight of newspapers, I hope he will be able to give them some consideration before the House goes into Committee, because I am certain he has been unwilling to bring this Bill before the House, but as he has had to bring it I am certain he is anxious it should not act unfairly to the particular interests affected by its provisions.

Mr. PETO: * * * The last speaker referred to the question of Press telegrams. Personally, perhaps, I have a special interest in the provincial Press and, as representing a provincial constituency, I may say I am very pleased that the right hon. Gentleman was able to say that he had so far modified the earlier proposals, when a great increase was suggested in the Press telegram rates, that he had got the approval and agreement of the parties who are mainly interested.

Colonel HARRY LAWSON: Only the agreement.

Mr. PETO: The hon. Member said that it might result in Members' speeches in this House being reported at less length. I would call his attention to the fact that the charge it is actually proposed to make is 1s. for eighty words, and I really think that if a speech in this House is not worth 1s. for every eighty words it had much better not be reported in the provinces or anywhere else. With regard to what the right hon. Gentleman said in reference to the remuneration of postal telegraph clerks, I was very much interested to know that not only was there such a great increase since 1885, but that the average of the postal telegraph clerks have now arrived at the dignity of being Income Tax payers or potential Income Tax payers.

Mr. HERBERT SAMUEL: In London.

Mr. PETO: I think it is very satisfactory to think that this great service is remunerated on such fairly generous lines, and that half of these gentlemen will be making Income Tax returns—at least I hope they will. * * * I have spoken already of the provincial Press with regard to Press telegram rates, and, on the other hand, I am very glad that the proposal to charge a penny postage on all newspapers has been dropped. Just as the hon. and gallant Member (Colonel Harry Lawson) was perfectly right in saying that any increase of the postal telegraph rates hits the provincial Press and not the London Press, so, if that proposal had been maintained, it would undoubtedly have been a great hardship to people in the country, who would have had to pay very highly for a newspaper delivered by post, which in many cases is probably the only way in which they can get it.

Colonel H. LAWSON: They will now in certain cases where the newspaper is over 6 ozs.

Mr. PETO: I was thinking more of the ordinary small daily paper, and not of one of the size to which my hon. and gallant Friend was referring. Although the right hon. Gentleman is wise in having dropped that part of the proposal, it would be recognised as a perfectly reasonable thing if some small surcharge for the period of the War were made. The right hon. Gentleman told us that the average telegram sent turns out to be a telegram of fifteen words, which, on the present scale, brought in a payment of 7½d. As he has shown us that he is practically making arrangements under this Bill to make the postal telegraph service self-supporting and to make both ends meet, I would suggest, as it is always a matter of great ingenuity to work a telegram with the address into twelve words, and as he has found from experience that fifteen is the average number of words, that he might, at very small cost and at great convenience to the public make this charge of 9d. a flat rate to cover a telegram with three more words than is usual now. Addresses, particularly country addresses, very often involve several words, and this suggestion, if carried out, would have the effect of giving the public ten words in which to convey what they want, leaving over five words for the address. That is a small suggestion I make in the opposite direction to the increase of the charge, but rather in the increase of the service rendered. If the right hon. Gentleman is going to tell us anything more about the Post Office to-day, I would like to ask him, as it is of particular interest in the present circumstances, how far he has gone with the large extension of underground work in connexion with telephone services which he had said had cost more than £1,250,000. I should also like to know, in regard to the restriction of public works, what is the position of the postal telegraph railway in the Metropolis, in reference to which we had a Bill upstairs, and which was to cost, I think, £10,000,000?

Mr. SPEAKER: We are not now discussing general Post Office Estimates.

Mr. PETO: I did not intend that as any criticism at all, but simply wanted to know what facilities were already completed, if the right hon. Gentleman could have told us. I hope most seriously he will consider the proposal I have made to him, and if he does not put down an Amendment to the Bill itself, which would be the most obvious solution of the difficulty, if I put down an Amendment in that sense, I hope he will give it his most careful consideration. It might be a way of saving a very large part of the revenue we give to the Post Office, which is abandoned in this Bill, and, according to the experience in Canada which was quoted by the hon. Member (Mr. Evelyn Cecil), particularly if it was to be a war surcharge only for the period of the War, would not result in any material diminution of the use the public would make of the postal service.

Sir W. BYLES: * * * To the other changes which are proposed I will not refer further than to express my acquiescence in the observations of my hon. Friend near me in regard to Press telegrams. The changes which have been made in the charges to newspapers for Press telegrams, as compared with the rates which were proposed in the first Resolution are, at any rate, tolerable if not thoroughly acceptable to the newspaper Press, but it should be remembered that it is not in the interests of newspapers only that these charges are adjusted to the capacity of the newspapers, but it is also in the interests of the public. It is the general public that profits by having its news diffused, not only in London but all over the provinces, by having columns of war news sent on the wires every night, and columns of general news, not to speak of Parliamentary news. It is of immense interest that all that is happening around us should be concentrated into the service of news, as it is by the great Press agencies and carried at such a rate as will enable the newspapers to present it to the public. I am extremely anxious that this matter should not be regarded as a class, or private, or trade interest at all, but in the interests of the public itself, the reading public—and all the public to-day is a reading public—and I am glad that the Press telegram rates are put at a figure at which it will be possible at any rate to give a good service of news. In all the complaints I have heard from people who were afraid of the additional tax which would be imposed upon them there is no one

who is not perfectly willing to bear his share of this costly War that we have been drawn into. There is an entirely loyal sentiment expressed by all these men who desire the continuance of the halfpenny stamp, and they are perfectly willing to bear their share, only they do not want to be ruined, and they do not want the revenue to suffer.

Mr. BRADY: I rise for the purpose of asking the Postmaster-General, or his colleague, a question which has been suggested to me. It has been publicly stated that this Bill contemplates, in addition to the increased charges which are set out, a diminution in the number of private wires. I do not find any warrant for that in the Bill itself, but it is just possible that such an arrangement can be carried out in a departmental manner without any statutory enactment. I cannot help embracing this opportunity to cordially endorse everything that has been said so eloquently and forcibly on behalf of the provincial Press by the hon. and gallant Member for Mile End (Colonel Lawson). If the proposals embodied in this Bill adversely affect the provincial Press of this country, they will still more adversely affect the Press in Ireland. In common with all the Members of this House, we who sit on these benches recognise that in the present national emergency, increased taxation, and increased cost to the public is necessarily involved, but at the same time, I cannot help thinking that in this matter as affecting the provincial Press the hardship would be more severely felt in Ireland than in other parts of the United Kingdom.

There is another matter which calls for attention. The Postmaster-General pointed out very properly the disproportionate cost of the long-distance telegrams. I recognise that many of these long-distance telegrams go to Ireland. The right hon. Gentleman will remember that some time ago he and I were engaged in a friendly controversy about the very frequent breaking down in the wires used for the purpose of conveying these telegrams to Dublin and other parts of Ireland. I hope that if he is going to get, as I know he is going to get, this increased cost for telegrams, that greater efficiency will be secured in the future for these long-distance telegrams to Ireland than has been secured in the past. The right hon. Gentleman will remember the very bitter complaint that was made by the Stock Exchange in Dublin, extending over two or three years, as to the constant delay in the transmission of Stock Exchange telegrams to Dublin. He took the matter in hand, and I think considerable improvement has been effected; but I cannot help thinking that in the transmission of long-distance telegrams to Ireland there is considerable room for further improvement, and I hope the right hon. Gentleman will take that into account. I should be very glad to hear from him, or from his colleague, that there is no intention of diminishing the number of private wires, so far as Ireland is concerned, in the future, in view of the serious effect it would have not only on the provincial Press, but on the whole of the Press of Ireland.

Sir G. TOULMIN: Perhaps I may be allowed to say a few words on this Bill, although I am rather personally interested, as I happened to be a representative of the Press in the interviews which took place with the right hon. Gentleman. The Press generally were very glad when this question was removed from the Taxes Bill, because there is a very strong feeling that one ought not to seem, and certainly ought not, to shirk any burden which may be placed upon us by the War. The Postmaster-General has administered this Government monopoly with very great consideration, and the Press have always found that he had an open mind to their necessities in any communications which we had to make to him. They were therefore very glad to meet him and to discuss this matter on a business basis and on the grounds of public policy. Personally I am extremely glad that we were able to come to a settlement and avoid the necessity, which I think the Press would have found themselves obliged to have recourse to, of pressing for an inquiry into the accounts and administration of the Post Office, the nature of which was indicated by the statement which the right hon. Gentleman has made. There are many points there which I expect might have been disputed; they are certainly very disputable. Nothing would have been more hateful during the War than discussing such details as these. I hope the House will recognise that there is a very large increase of cost imposed by the new charges upon the Press. When the deputation was genially dismissed by the Postmaster-General they felt that they had been pretty closely shorn, but I have received sufficient information from different parts of the country to show that we at present accept in good faith this settlement of a very long-standing controversy between the Press and the Post Office, and that we are extremely glad that that settlement has been come to.

The House may not appreciate the terribly critical position in which the original proposals would have put a very large portion of the provincial Press. From information and figures with which I have been supplied from various quarters, I cannot help thinking that those proposals would have been fatal in certain parts of the provinces to some of the newspapers which are struggling against the competition of London and of the larger cities. So great a change as that which was proposed at first we felt was not merely a matter of account, but was a question of a change of public policy, affecting almost every provincial constituency in the three Kingdoms. It would have reduced very seriously the facilities of the local Press for commercial, markets, law, and foreign telegrams, and for Parliamentary news as well as for general political intelligence, a change which, I think, would have lowered the status of the whole community served by these local papers. I do not wish to do more than express my pleasure at the agreement having been arrived at. Hon. Members on the other side have indulged in some criticism in reference to the year's notice. I do not think that, when two firms are dealing together in such a large matter as the upsetting of an arrangement which has been carried on for forty or fifty years, such notice was too long. A year's notice, I think, was reasonable in such a case. Existing contracts would have to go on. They could not well be altered, and the time which has been given

gives to the Press an opportunity of arranging the details of business. This matter affected a comparatively small number of firms, perhaps a hundred and fifty, certainly not more than a few hundred, in amounts varying from £500 to perhaps £5,000 a year, and it was a very great change to impose at such very short notice. That is decreased by the agreement to which we have come, and so far as this portion of the Bill is concerned, I hope that the House will see its way to endorse the proposals of the Postmaster-General.

Colonel YATE: I would like to join the last speaker in expressing my thanks to the right hon. Gentleman, the Postmaster-General, for the concessions which he has given to the provincial Press. We have all of us received a memorandum from him on the subject, and we all rejoice at the concession which has been given to the small provincial Press. I also congratulate the right hon. Gentleman on having put a stop once for all to the 4-oz. postage for 1d. I have always thought that the allowance of 4 ozs. for 1d., in the case of letter postage, was far more than was necessary, and I think that we are all agreed that the Post Office should be a paying concern and not run at a loss, especially in present circumstances. I am delighted that the halfpenny postcard system has been allowed to remain, and I join with the previous speaker in expressing my hope that the Postmaster-General will take some steps to stop the use of postcards which are printed in Germany, so that we may use only English postcards which are manufactured in England. Whatever arrangement may be necessary, I trust that these German postcards will no longer come into England in the way in which they are coming now.

Mr. PRICE: Though I am not a member of the Press I have received a large number of communications from provincial papers asking me to oppose the original proposals. Therefore I am very glad indeed to hear that the Postmaster-General has come to an arrangement with the representatives of the Press. May I ask him whether he will now take into consideration the statements which are placed before us as to economies in the Post Office itself? The communications which I have received point out that some of the departments of the Post Office were working under old and obsolete methods, and therefore while terms are being adjusted it might be advisable for the Postmaster-General to get into communication with the persons who have made these statements and receive and consider their suggestions, because it is still open to the Post Office to reduce expenditure and to make a profit on the whole matter. I was greatly impressed by statements which were sent to me, and by a personal interview which I had with some newspaper proprietors regarding the matter. * * * I congratulate the right hon. Gentleman on settling a long-standing quarrel regarding the Press. It has been up here every year ever since I have been here. I hope now that it has been finally settled, and that it will not be up again in my time.

Mr. DENNISS: I desire to ask a question in the interests of economy which would mean an addition to the revenue. I understand that there is a large loss on the Press telegrams, but I have always been opposed to any increase in the charges for Press telegrams for reasons which have been given at great length in this House, and which I need not repeat. I understand that the original proposal was that the rates should be raised by 200 per cent. Now we have come down to 50 per cent. That being the case, there must still be a large loss upon these Press telegrams. There is a certain company of engineering and Government contractors who have been in communication with the right hon. Gentleman and who have expressed their willingness to undertake to handle the whole of the news traffic of the whole country at existing rates, and then to do the work, they say, even more expeditiously than the Post Office. I would ask the right hon. Gentleman whether he will consider that proposal, and is he prepared to say whether such a scheme as that might not introduce real economy, and be a great saving of the loss upon Press telegrams which is now incurred. If the experiment succeeds it must revolutionise the methods of the Post Office and lead to a great national saving in that Department. If it fails, then the right hon. Gentleman will of course take a guarantee before entering into any contract with these gentlemen. But if these people do it, I will not say more expeditiously, though that is what they claim themselves, but if they do it at existing prices, the Post Office will not only save all loss but may be able to reorganise the whole of the existing telegraphic system.

The ASSISTANT POSTMASTER-GENERAL (Mr. Pike Pease): As this is the first time that I have had the honour of speaking for the Government from this bench I trust that my remarks will receive the kind consideration and sympathy of the House. * * *

Everyone in this House knows that a great many trades have suffered during the War, and anyone who considers the subject will agree that no interest has suffered more than has the newspaper interest, owing to the fact of the decreased amount of advertisements received and other causes. Under the circumstances, I feel perfectly certain that the Postmaster-General could not come to any other conclusion than that as to the rates previously suggested it was necessary, so far as the Press were concerned, to reduce those rates. I am very glad that the Member for Bury (Sir G. Toulmin), who was the spokesman for the deputation, is satisfied with the arrangement which has been come to. Although he says that the Press of the country has been fearfully shorn, I am quite sure that they have received ultra-generous treatment, and that they ought to be very well satisfied with the position in which they are placed, when we consider that the services rendered are great and the payment is little. In regard to the question raised by the hon. Member for Spen Valley (Sir T. Whittaker) as to the Retrenchment Committee, views may be held which are not exactly in accord with those of the Post Office, but I am perfectly certain that the Department will be only too delighted to consider any inquiry so far as the Post Office arrangements are concerned.

With regard to the remarks made by the hon. and gallant Member

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital).

Telephone: 1300 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund; Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3 6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3S. 6D. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

	Per Pair
Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses	3 6
Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames	7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE. WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

HASTINGS

AN AUTUMN RESORT.



TRESSIDDER-HOUSE

HOLIDAY HOME for LADIES

For Particulars and Terms apply to the Hon. Sec.:

Mr. THOS. HUME,

The Sunday School Union,

56, Old Bailey, London, E.C.

ESTABLISHED OVER 25 YEARS. HIGHEST AWARDS—12 GOLD MEDALS.

HARRY HALL

"THE" COAT & BREECHES SPECIALIST, LADIES' COSTUME & HABIT MAKER.

149, CHEAPSIDE, E.C. 207, OXFORD STREET, W.

(Near G.P.O.)

(Near Oxford Circus.)

SERVICE DRESS

FOR IMMEDIATE WEAR or to ORDER IN 24 HOURS.

ACCURACY AND FIT GUARANTEED

Field Service JACKET	from 55/-
BREECHES	25/-
GREAT COAT	84/-
WARM COAT	65/-
RAINCOAT	55/-
POT FEES	6/6
LEGGINGS	25/-

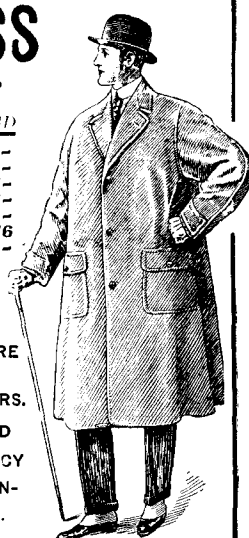
PATTERNS POST FREE.



NATIONAL GUARD VOLUNTEER TRAINING CORPS OUTFITS (as approved by Central Association V.T.C.)



To MEASURE in 24 HOURS. FIT AND ACCURACY GUARANTEED.



"Hallzone" Ideal Lounge Suit from 55/- (As sold elsewhere from 3 & 4 Gns.)

"Hallzone" Ideal Morning Coat and Vest from 55/- (As sold elsewhere from 3 & 4 Gns.)

PATTERNS POST FREE.

"Hallzone" Ideal Semi-Raglan from 55/- (As sold elsewhere from 3 & 4 Gns.)

"Hallzone" Ideal Dress Suit from 84/- (As sold elsewhere from 5 & 6 Gns.)

PATTERNS POST FREE.

Perfect Fit Guaranteed for Suits, Breeches, &c. from our simple Self-Measurement Forms. BEST MATERIALS and WORKMANSHIP ONLY. UNEQUALLED VALUE, FIT and STYLE. Visitors to London can leave Record Measures for future use, or can Order & Fit same day.

Wales & McCulloch

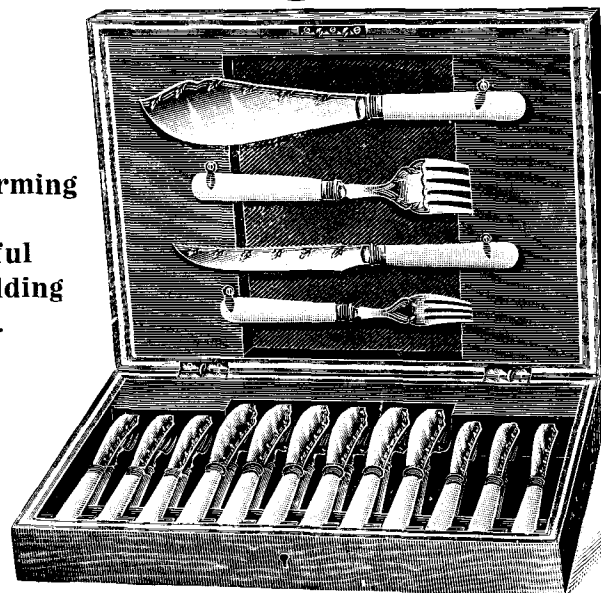
ESTAB. 1853

Watchmakers to



The British Admiralty

Charming and Useful Wedding Gift.



FINE QUALITY ELECTRO-PLATE BLADES, SOLID SILVER MOUNTS, AND BEAUTIFUL WHITE HANDLES.

6 pairs Fish Knives and Forks	£1 10 0	Complete £5.5.0
6 " Fruit Knives and Forks	1 8 6	
1 pair Fish Servers	12 6	
1 " Cake Servers	8 6	
1 Fitted Oak Case	1 5 6	

Special Terms to all Postal Employees.

20, LUDGATE HILL,

LONDON

56, CHEAPSIDE.

Near St. Paul's Cathedral.

Next Bow Church.

(Colonel H. Lawson), I think we all appreciate the particular views which he expressed in regard to the telegraph rates. He is the owner of a well-known newspaper in this country. The point which he has raised has been to a very great extent in the mind of my right hon. Friend, and it was realised by him that an increase of the telegraph rates would affect adversely, to a very large extent, the provincial interests in this country, and, so far as the future is concerned, the reason why these charges are not made up to the end of next year is that many contracts, which have been already made, must necessarily be taken into account. With regard to the future there is no probability that this charge will be reduced, because these services are rendered at a considerable price, and the charge, it is suggested to-day, is an equitable one, and can be completely justified. I do not know whether Members have considered the possibilities of the future, and what they may be, but so far as taxation is concerned, I see no likelihood of a decrease of it in this country within the next few years. My hon. Friend the Member for Devizes (Mr. Peto) made the suggestion that the number of words in a telegram might be fifteen instead of twelve. I am sorry to say to him that I am afraid that is quite impossible, because it would not be remunerative to the State, and under existing circumstances it is absolutely necessary for us to consider only that, though we naturally wish to consult the convenience of the public, as far as possible. With regard to the question of charges in this Bill, I would like to point out that in regard to inland packets, not exceeding 2 ozs., they come under the old letter rate. Under the old rate packets exceeding 2 ozs. in weight came under the letter rate of one halfpenny for each 2 ozs. Under the proposed rate packets exceeding 2 ozs. will still be liable to be charged at letter rate. That rate will be $1\frac{1}{2}d.$ per packet, and between 2 ozs. and 3 ozs. the charge will be $2\frac{1}{2}d.$, instead of $1d.$

Mr. PETO: Does that mean ordinary letters?

Mr. PIKE PEASE: It means all packets of any kind except newspapers. With regard to the point raised by the hon. Member for Pontefract (Mr. Booth), I understand that there will be an additional charge, so far as the approved insurance societies are concerned, and it will be the duty of those societies to reduce the weight to within 2 ozs., so that there shall not be any additional charge. In reference to my hon. Friend the Member for Salford (Sir W. Byles), I am very glad that the Postmaster-General has received his congratulations. I know that he took a very prominent part in this controversy, and I understand that the changes are acceptable to him, though not very palatable. The fact is that old taxes are bad and new taxes are always worse, but many of those who find these taxes hard must realise their necessity. In reference to the question of my hon. Friend opposite as to private wires, they will not be affected. There is only one other point to mention, and it is the one referred to by my hon. Friend the Member for Edinburgh (Mr. Price) in reference to the new machine telegraphs. The Postmaster-General gave an explanation to the House on that question, and in regard to machine telegraphs, so far as the Treasury will allow, we shall extend that system throughout the country. I appeal to the House to now give the Bill a Second reading.

Bill read a second time, and referred to a Committee of the whole House on Tuesday next.

"BROKEN IN OUR WARS."

THE great war had been in progress but a few days over eleven months when the French Government took the first step towards securing employment by the State of its sons "broken in the war." Quite naturally that step consisted in the appointment of a committee "instituted under the presidency of the Minister of Commerce, Industry, Posts and Telegraphs, to study the conditions and proportions in which the disabled soldiers could be absorbed in the ranks of the Postal and Telegraph Services." This committee consists of 22 members, and includes the directors of the Savings Bank, Telegraph, Telephone Services; the district directors of the Seine and Puy-de-Dôme; Dr. Sass, the medical officer of the Department, and seven representatives nominated by the various Service associations.

The terms of reference may be judged from the official circular (No. 202, of May 20, 1915), which has been issued by the Minister. With characteristic devotion to that exact definition of principle which marks all French political investigation, it is laid down that "The State cannot be disinterested in the fate of these victims of the war, and it is expedient to reserve for them in the public employ as large a proportion as the exigencies of the Service permit," but "it must not be overlooked that the proper discharge of the different services that devolve upon the administration of the Post Office and the Telegraphs can only with difficulty be reconciled with the presence among the *personnel* of a large body whose members are deprived of the free use of their physical faculties. It is only by minute enquiry that this proportion can be determined; and it must not be forgotten [the role of honour published in the monthly bulletin is an eloquent reminder] that many men already

in the Service as postmen or in other capacities, who have been mobilised will return with an unfortunate diminution of efficiency as the result of wounds or disease.

The demands made on the individual in the discharge of his duties are next recapitulated, and among the infirmities cited as not constituting a cause of elimination, are deafness in one ear, partial loss of sight, loss of fingers or thumb.

The circular concludes, "on the one hand reasons of humanity and national solidarity (one almost catches the echo of a session in the annual conference of I.A. G.) demand that employment should be found for the victims of the war; on the other the care for the general interest imposes the obligation to admit only those who can fulfil all the duties of their class, duties which daily become more varied and onerous. The responsibilities of the Department, and in a measure, the proper discharge of the services in the future depend upon the measure that will be taken as the result of this enquiry. It is important, therefore, that the results should be as exact as possible and be based not on *a priori* reasons, but upon an examination of the actual conditions in which the Services operate.

One recognises the responsibility of the committee and the delicate nature of its task. The report and the result will be followed with interest in every administration, and especially in those for whom the same problem in varying degree is at present daily posing itself.

E. C. G.

EFFECT OF WEATHER ON EXCHANGE FAULTS.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

HAS it occurred to any of your engineering readers that between the daily weather report and cord faults at C.B. exchanges there may be a very intimate connexion? A perusal of the weather reports for the last fortnight or three weeks will reveal the fact that during that period there has been an excessive amount of humidity in the atmosphere.

In the C.B. exchange on which I am privileged to exercise such engineering faculties as I have, we use steel conductor cords chiefly, and recently a considerable number of the following type of fault have occurred. The "A" conductor of the cord oxidises just at the point where connexion is made with the "tip" screw of the plug, and breaks off—your test clerk readers will know the fault. The period of the abnormal number of these faults has coincided with the period of excessive humidity recorded by the meteorologists, and I have inferred that the extra moisture finds its way between the brass plug and the fibre cover just in sufficient quantity to affect that portion of the steel conductor—however small—which is left uncovered by binding thread. The memoranda of some of my C.B. colleagues on this somewhat curious connexion between weather and work would be interesting.

D. D. ROBINSON.

Ilford, Aug. 21.

THE LONDON TELEPHONISTS' SOCIETY.

SESSION 1915-16.—The meetings of this society for the seventh session will be held on Tuesdays or Thursdays at 7 p.m., and the arrangements are as follows:—

1915.

Oct. 19, Tuesday ... Presidential address—Mr. T. A. Beck. Subject: "Some Aspects of Service."

Nov. 16, Tuesday ... Debate:—"The Ideal Telephonist—He, She, or It?" "He" will be supported by Mr. Horace Dive, (Traffic Branch L.T.S.). "She" will be protected by Miss James (Chief Supervisor, Mayfair Exchange). "It" will be allowed to look after itself.

Dec. 7, Tuesday ... An illustrated lecture by Miss Florence J. Minter (Superintendent of Traffic, Constantinople Telephone Co., temporarily attached to the Statistical Section, Secretary's Office). Subject: Constantinople. Its people and its telephones."

1916.

Jan. 13, Thursday ... A competition paper will be read. Particulars of competitions will be advertised later. There will also be a debate:—"Should the Information Desk be staffed by Telephonists or Supervisors?" The telephonists will be supported by Mr. J. R. Jacob (Avenue Exchange Manager). The supervisors will be supported by Miss L. M. Reid (Supervisor, Operating School, London Wall).

Feb. 15, Tuesday ... Competitions papers will be read. Discussion is invited at all these meetings.

March 16, Thursday Colonel A. M. Ogilvie, C.B. (Director of Army Signals, Joint Second Secretary to the Post Office), has consented to be present to distribute the competition prizes and will give an address.

LONDON TELEPHONE SERVICE NOTES.

WITH the present number we celebrate our second birthday, that is we are a year old, and although *London* still leads in the number of copies disposed of, the support accorded to this journal at the exchanges shows strange variations. The representative for the *New Cross* district is to be congratulated on the fact that she of all the L.T.S. agents disposes of the largest number of copies, whilst for an individual exchange *Avenue* heads the list with the highest aggregate circulation. Of the bigger exchanges *Mayfair* shows a total of subscriptions representing the highest percentage of copies taken to staff employed, but the palm in this respect has to be given to a small exchange, since at *Barnet* no less than 80 per cent. of the staff are *annual subscribers* paying in advance, and at *Barnet* they are reported to say "London leads—let London lead, but by *Barnet's* bounty." It is not proposed in these notes to divulge the names of those exchanges where the poorer results have been obtained, but at one large exchange at least the circulation grows weaker and weaker to an alarming extent, the copies at present taken being only twelve against an original distribution of 106, although the staff nearly overtops 200. The only explanation forthcoming for the "falling from grace" is that the journal lacks interest for the telephonists, but no suggestions are vouchsafed as to methods by which the flagging interest is to be revived. In any case it is satisfactory to know that the journal flourishes financially, and the management express their appreciation of the work done by the local agents, whose task often grows harder as the number of copies disposed of grows smaller.

We have previously referred in these notes to the difficult problem of selecting suitable colour schemes for multiple pegs, and those difficulties are apparently still with us, for only recently the Research Section of the Traffic branch received from a supervisor at one of the inner London exchanges a report couched in these terms: "It is thought that as white pegs are connected to the information desk the red pegs might be white pegs also, as the desk has the necessary information." That the lady's thoughts were justified would seem apparent, since the exchange manager's endorsement ran: "I agree, and covering authority will perhaps be given." The Research Section venture the suggestion that probably "colouring authority" should be read for "covering authority." In any case it seems certain that the ancient riddle of the newspaper will now be applied to multiple pegs as things which are "black and white and red (read) all over."

There is a tale in circulation here about a noble knight, who recently retired from very high office in the Department, and a subordinate member of the L.T.S. It appears that the noble knight, whose activities in the Department were prodigious, retains a craving for work which he has been quite unable to satisfy by labours during the day on War Relief and Super Select Committees. He has therefore turned his attention to voluntary munitions work at night, but before he could be permitted further to spend himself in his country's cause he had perforce to obtain a certificate of character from two householders who had known him for five years and who would be prepared to vouch for the fact that he was a true and loyal subject of the Crown. Now it fell out that on the day this certificate was to be signed the before-mentioned subordinate official of the L.T.S. had business in a quarter where was to be found the noble knight, and the latter, with a passion it is to be feared for the incongruous, asked the former to be one of his sponsors. As, since signing the certificate, the subordinate official has removed his household and effects to another neighbourhood, we are presented with the picture of a police search for his whereabouts in order that he may personally verify the fact that he had vouched for the loyalty of a K.C.B. and former Secretary to the Post Office. Who shall say hereafter that England in organisation is behind Germany!

Just as we go to press we hear of a scheme for sending to each of the L.T.S. men now with the Forces a Christmas gift as a reminder that his *confreres* here have him constantly in mind. Since there are considerably more than 500 such absentees a large sum will be required if a suitable gift is to go to each, but the staff of the L.T.S. is large and notoriously generous, so that we do not anticipate any difficulty in raising all the money necessary. The scheme is one which we feel sure will appeal to all, and we would say to those who may be approached:

"Give all thou canst; high Heaven rejects the love
Of nicely calculated less or more."

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

Resignations—

Miss HENRIETTA ELIZABETH HERFORD (Assistant Supervisor, Class II) has resigned on account of her approaching marriage, and was presented with a silver Queen Anne tea service by the staff of the Hampstead Exchange.

Miss K. TARPEY (Assistant Supervisor, Class II) has resigned to be married, and was presented by her colleagues at the City Exchange with a tea service and other gifts.

Miss E. M. BURRELL (Assistant Supervisor, Class II) has resigned in view of her approaching marriage, and was presented by the staff of the City Exchange with a dinner, tea and breakfast service and other gifts.

Miss D. K. WYETH, of Battersea Exchange, was, on leaving to be married, presented by her colleagues with several useful gifts, including a dinner service.

Miss MERCY ALICE GOODWIN, of the Wimbledon Exchange, has resigned to be married, and was presented by her colleagues with a coal vase and several useful gifts.

Miss N. D. MITCHELL, of Chiswick Exchange, has resigned on account of her approaching marriage.

Miss EVELYN MARY BEAGLEY, of Hampstead Exchange, has resigned in view of her approaching marriage, and was presented by her colleagues with a dinner service.

Miss M. G. KENNEDY, of North Exchange, has resigned to be married. Miss BERENICE L. CORNISH, of the Trunk Exchange, has resigned to be married, and was presented by her colleagues with a silver tea service and other gifts.

Miss IDA M. HUNTER, of the Trunk Exchange, has resigned on account of her approaching marriage, and was presented by her colleagues with a dinner service and several other gifts.

Miss AGNES J. SKILLERN, of the Trunk Exchange, has resigned to be married, and was presented with a large number of useful gifts by the staff.

Miss EVA C. FLETCHER, of Trunks, has resigned.

Miss LAURA L. WARE, of Trunks, has resigned.

Miss WINIFRED E. PAGE, of Trunks, has resigned.

Miss CONSTANCE F. TOMS, of Trunks, has resigned.

Miss ANNIE N. LARKIN, of Trunks, has resigned.

Miss D. M. BUBBEAR, of Brixton Exchange, has resigned on account of her approaching marriage.

Miss E. L. BARKER, of Avenue, has resigned in view of her approaching marriage.

Miss E. J. DENLEY, of Avenue Exchange, has resigned.

Miss FLORENCE DEVINE, of Victoria Exchange, has resigned to be married and was presented by her colleagues with a dinner service.

Miss EDITH McLAREN, of Victoria Exchange, has resigned on account of her approaching marriage, and was presented by her colleagues with a dinner service and other useful gifts.

Miss BEATRICE B. BOLLINSON, of East Exchange, has resigned in view of her approaching marriage, and was presented with a tea service and several other gifts.

Miss M. A. O'KEEFE, of City Exchange, has resigned, and was presented by her colleagues with a nut stand and tea knives.

Miss W. M. FREIBERG, of Museum Exchange, has retired.

Miss C. M. E. DAVIDSON, of Museum Exchange, has resigned.

Miss R. G. WATERWORTH, of Paddington Exchange, has resigned on account of her approaching marriage.

Miss L. V. A. HOLFERT, of Battersea Exchange, has resigned.

Miss H. M. SMITH, of Battersea Exchange, has resigned.

Miss W. M. McNAMARA, of Woolwich Exchange, has resigned to be married, and was presented with a dinner service and numerous other gifts.

Miss S. A. PEARSON, of Woolwich Exchange, has resigned in view of her approaching marriage, and was presented with several useful gifts, including a dinner service.

Transfers—

Miss S. M. KELLY (Assistant Supervisor, Class II), transferred from Park to Kensington Exchange.

Miss TIMEWELL has been transferred from Dalston to North Exchange.

Miss GARNHAM has been transferred from Croydon to Purley Exchange.

Miss SHAW has been transferred from Purley to Croydon.

Miss L. BEARDWELL, Sydenham Exchange, has been promoted to be Assistant Supervisor, Class II, at Croydon Exchange.

Miss R. A. STREVS, Sydenham Exchange, has been promoted to be Assistant Supervisor, Class II, at Croydon Exchange, and was presented with a gold fitted handbag.

Miss E. M. WOOLL has been transferred from Sydenham Exchange to New Cross, and was presented with a silver cake basket and other presents by the staff.

Miss J. E. PETERS has been transferred from Sydenham to Victoria Exchange, and was presented with an antimony rose bowl from the staff.

Miss A. L. WEST, Sydenham Exchange, has resigned to be married, and was presented with a dinner service, tea service and many other useful presents.

PROVINCIAL STAFF.

Mr. G. D. BATEMAN, Assistant Traffic Superintendent, Plymouth, was the recipient of a set of drawing-room pictures from the staff on the occasion of his marriage. He was also presented with a silver flower vase by the staff of the Cardiff local exchange, with whom he was associated prior to being transferred to Plymouth.

Mr. J. W. KAY and Mr. T. F. MOODY, Doncaster, have been promoted to be Overseers.

Mr. G. W. CAMPBELL, whose appointment as Contract Manager, Chester, was recorded in last month's issue, was presented with a case of pipes and a fountain pen on leaving York.

Mr. A. G. BRISTOW, Traffic Superintendent, Swansea Telephones, was presented with a clock and tea service by the staff on the occasion of his marriage.

Miss A. T. LETCHER, Clerical Assistant, Swansea Telephones, has resigned to be married, and was presented by the staff with a dinner cruet.

Miss A. U. DOWMAN, Assistant Supervisor, Class II, Swansea Trunk Exchange, has resigned to be married, and was presented by her colleagues with a silver tea service and many other useful gifts.

FREE

To readers of
Telegraph & Telephone
Journal.



To introduce to the readers of this Journal the Oatine toilet preparations which appeal specially to men, a special trial Outfit has been prepared which will be sent free to all sending 3d. (in 3d. stamps), to cover cost of postage and packing.

The OUTFIT contains:—
A Trial Oatine Shaving Stick; A Trial Size of Oatine Face Cream;
A Packet of Oatine Shaving Powder; A Trial Size of Oatine Snow;
A 3d. Tablet of Oatine Toilet Soap; A Packet of Oatine Talcum Powder;
A 50-page Book on the Care of the Skin.

Oatine

Every man knows the feeling of real satisfaction and comfort experienced after a shave which is accomplished quickly and easily. Such a shave is assured to all who use the Oatine Shaving preparations and in the belief that nothing can be more convincing than a personal test, The Oatine Co. offer to send this trial Outfit to all sending 3d. in 3d. stamps to cover cost of postage. A similar Outfit for Ladies, containing equally useful preparations, may also be obtained for 3d. to cover cost of packing and postage, or both outfits will be sent for 6d.

THE OATINE CO.,
114c, Oatine Buildings, London, S.E.



Why not open an account at CRICHTONS'

the great convenience
easy terms, and splendid
value are unapproachable.

A Customer writes us from
St. Pancras:

"I will do my utmost to recommend you
as I am so pleased with your value. Your
monthly system is a boon and a blessing."

Let CRICHTONS' supply all your present
needs.

Send for the Mode Book, latest edition.

Coats and Skirts.
Blouses.
Trunks.
Dainty Frocks.
Charming Underwear.
New Raincoats & Macs.
Shoes,
Furs, Fur Coats,
Overcoats, etc., etc.

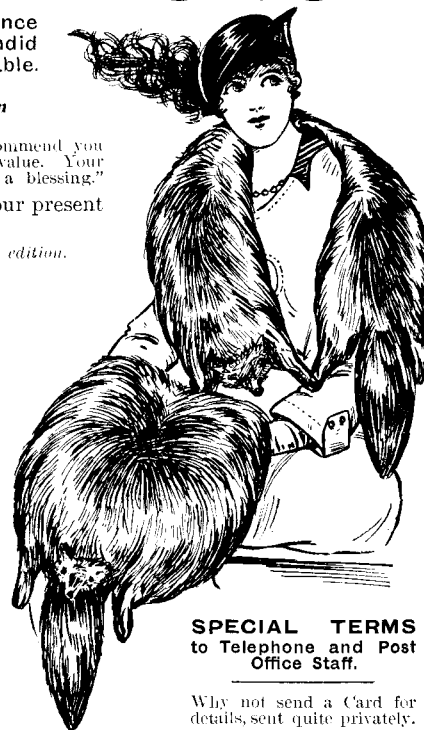
Everything supplied on our
well-known "Times" System,
strictly private and confi-
dential, from 5.- monthly.

CRICHTONS' Ltd

Manufacturing Furriers
and Ladies' Tailors,
14, CRICHTON HOUSE,
DEVONSHIRE SQUARE,
LONDON E.C.

(One minute from Liverpool Street
Station).

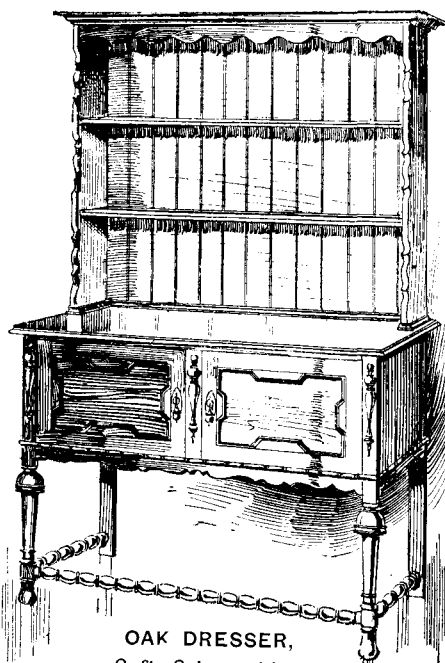
KNOWN AND RECOMMENDED EVERYWHERE.



SPECIAL TERMS
to Telephone and Post
Office Staff.

Why not send a Card for
details, sent quite privately.

CIVIL SERVICE MUTUAL FURNISHING ASSOCIATION LIMITED.



OAK DRESSER,
3 ft. 6 ins. wide,
£4 17s. 6d.

This Association was founded in 1877 by Civil Servants
for the purpose of affording to Civil Servants and their
friends Special Facilities for Buying

Household Furniture

&c.,

ON EXTENDED PAYMENTS.

FULL PARTICULARS WILL BE FORWARDED ON APPLICATION
TO THE SECRETARY.

ONLY ADDRESS:

15, CHARTERHOUSE STREET,
HOLBORN CIRCUS, E.C.

Do you realise that if it were not for the British Fleet you would now be searching the gutters for bread?

This is the plain, unvarnished truth. We should literally be starved out in three months but for the Navy! Yet what do YOU know about its ships? What do YOU know of the men who built it up, of its development from the wooden walls of old to its constitution to-day? You cannot appreciate the Navy as you ought unless you understand it.

THE BRITISH BATTLE FLEET

ITS INCEPTION AND GROWTH THROUGHOUT
THE CENTURIES TO THE PRESENT DAY

By FRED T. JANE,

Author of "Fighting Ships," "Heresies of Sea Power," &c., &c.

WITH

Twenty-five Illustrations in Colour from Water Colour Drawings

By W. L. WYLLIE, R.A.,

and numerous Plans, Maps, and Photographs, &c.

THE ACCOMPLISHED AUTHOR.

It is the work of a man who writes out of the fulness of knowledge that comes from a lifetime study. An author who writes in such a way as to render a subject, bristling with technicalities, as clear as noonday to all.

This book is no mere catalogue of fighting ships, but the only genuine

HISTORY OF THE NAVY.

It treats of types and designers of those types, takes account of every genuine improvement in "effectiveness" from the days of the "Great Harry," commissioned by Henry VII., and the first British ship designed and used exclusively for war, down to the largest and latest of our super-dreadnoughts, "The Queen Elizabeth."

It gives an authentic account of the important new arms

THE SUBMARINE AND THE WATERPLANE.

Mr. Jane graphically describes both the uses and the limitations of these remarkable engines of war.

In short, this is probably the most vital book of the day, for it makes plain to all the great task with which our men and our Fleet is entrusted.

SPECIAL VALUE TO MUNI- TION WORKERS AND INVENTORS.

New inventions were never in such demand. The Admiralty and the Munition Department have both set up influential Boards of Distinguished Men specially to examine all ideas submitted, but these ideas must be practical. Read "The British Battle Fleet" to understand what is wanted by the Navy.

YOUR SONS IN THE NAVY WILL WANT IT.

They will revel in this book if you send it to them, or keep it until they return to civil life. They know it is written by an able man well qualified to write what is undoubtedly the best account of the Navy, its present purpose and past achievements.

"THE REFEREE" says:—

"The author has 'done his bit' to turn our rule-of-thumb nation into a scientific nation by explaining how the wheels go round. . . . In these days such a book as this is priceless."

ILLUSTRATED CONSPECTUS FREE.

Containing Coloured and Black and White Prints of Famous Ships together with full details showing how the work can be purchased by all without strain upon the pocket.

Please send attached Enquiry Form or a postcard mentioning *The Post Office Telephone and Telegraph Journal*.

The Library Press, Ltd.,

Portugal Street Buildings,

5 & 6 Portugal Street, London, W.C.

Please send me the Illustrated Conspectus of "The British Battle Fleet."

This request does not in any way imply that I will purchase the book.

Name

Address.....

Silk and Cotton-Covered H.C. Copper Wire.
Asbestos Covered Wire.
Charcoal Iron Core Wire,
Resistance and Fuse Wires.
Binding Wires.
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
"ORMISTON, LONDON." 13259 CENTRAL.

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.

CIVIL SERVICE Share Purchase and Investment Society, Ltd.

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year.	2 Years.	3 Years.	5 Years.	7 Years.	10 Years.
17s. 4d.	9s.	6s. 2d.	4s.	3s.	2s. 4d.

Stocks and Shares bought or sold through the agency of this Society.
Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society exceeds the sum of £500,000.

The United Kingdom Postal, Telegraph, and General Civil Service
Benevolent Society. (Assurance Companies' Act, 1909).

JOIN

THE NORTHAMPTON

Section A—For Ordinary Life Assurance,
" B—For GRATUITY BENEFIT,
" C—For Insurance of Wife.

MAXIMUM BENEFIT

Section A	£150
" B	£150
" C	£48

The only Society in the Service, having similar objects, which
uses tables drawn up by an Actuary.

Rapidly Increasing Reserves.

Economic Management.

No Shareholders' Profits to pay.

Join the Best and Soundest Society.

Contributions according to age. The younger you join the higher the benefit.

APPLY LOCAL SECRETARY, OR OF

W. T. BRAIN, CENTRAL SECRETARY, 19, Surrey Street, Strand, W.C.

It would be appreciated
if readers would
kindly mention the
Telegraph and Telephone
Journal when responding
to advertisements.

THE Telegraph and Telephone Journal.

VOL. II.

DECEMBER, 1915.

No. 15.

CONTENTS.

	PAGE		PAGE
NEWPORT AUTOMATIC EXCHANGE. BY B. WAITE.	45	EDITORIALS—	
THE DAWN OF TELEPHONY IN BIRMINGHAM: A FEW EARLY REMINISCENCES. BY ARTHUR E. COTTERELL	48	INDUSTRIAL RELATIONS	56
SOME NOTES ON WIRELESS TELEGRAPHY AND THE WAR. BY B. S. T. WALLACE	50	THE RESIDUUM OF EFFORT	56
THE WORK OF THE WOMEN OF THE LONDON TELEPHONE SERVICE IN WAR TIME. BY A. A. HEAP	51	HIC ET UBIQUE	57
TELEGRAPHIC MEMORABILIA	52	SOME TRIALS OF THE PHONOGRAM SUPERVISOR. BY EDITH M. MATTHEWS	58
THE SPIRIT OF ORGANISATION	53	OUR MONTHLY RECORD OF BRAVE DEEDS	59
THE TELEPHONE AT THE FRONT	54	LONDON TELEPHONE AND TELEGRAPH SOCIETY	60
A FEW GLIMPSES OF POSTAL WORK. BY W. W. YOUNG	54	CORRESPONDENCE	64
		THE IMPORTANCE TO THE FEMALE STAFF OF BEING EARNEST: AN APPRECIATION. BY A. GROSCH	64
		LONDON TELEPHONE SERVICE NOTES	65
		PERSONALIA	65

Subscription: To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies: To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

NEWPORT AUTOMATIC EXCHANGE.

BY B. WAITE (*District Manager, Cardiff*).

ON Aug. 14, 1915, the largest exchange in the country at present working on the full automatic principle was opened at Newport (Monmouth). Formerly there were three exchanges:—

	Exchange lines.
Newport Dock Street, working magneto	1,050
.. Maindee	216
.. Post Office .. common battery	158
	<hr/> 1,424

On the opening of the automatic exchange the three above-mentioned exchanges were thrown out of use. Many old associations, so far as ex-National staff are concerned, go with the two former exchanges, but in telephony the cry must ever be "Get up to date," for there can be no standing still if we are to give the efficient service which subscribers demand. Can the automatic exchange do this? To judge by the results so far obtained at Newport the answer is "Yes," and there is undoubtedly a great future for automatic working.

Newport has been fitted with the Strowger system, the contractors for the work being the Automatic Telephone Manufacturing Company, Limited. The equipment is for 1,850 lines divided as follows:—

Ordinary units of 100	1,300
Private branch exchange units	350
Party line and coin box units	200
	<hr/> 1,850

The number of lines working at the opening was 1,424.

The Strowger system of automatic working was fully described by Mr. W. J. Bailey in the *Post Office Electrical Engineers' Journal* for July 1912, and later developments were described by Mr. J. Hedley in the same journal for July 1915.

The introduction of automatic exchanges into this country

has brought about an entirely new phase in the study of traffic departments, and at the outset it is advisable before any traffic data is got out that the methods and the system to be adopted should be specifically laid down. At Newport it was decided that an automatic exchange should be constructed, but it was necessary to fit a number of manual boards so that trunk and junction calls could be dealt with by operators as heretofore. In each of the three existing exchanges subscribers' and junction circuits were working in conjunction with the trunk exchange at the head Post Office and in order to prevent interruption of the service as much as possible, the trunk circuits were transferred to the new manual boards in advance of the transfer of the subscribers' circuits to automatic working. The arrangement of the service between the three exchanges so far as trunk working was concerned necessitated a special study of the subscribers' trunk requirements, as before this transfer a trunk record table was working under the conditions which apply generally at the present time throughout the country, viz., all subscribers asking for "trunks" were connected with the record table, gave the particulars of the subscriber required, and were called when the connexions were completed.

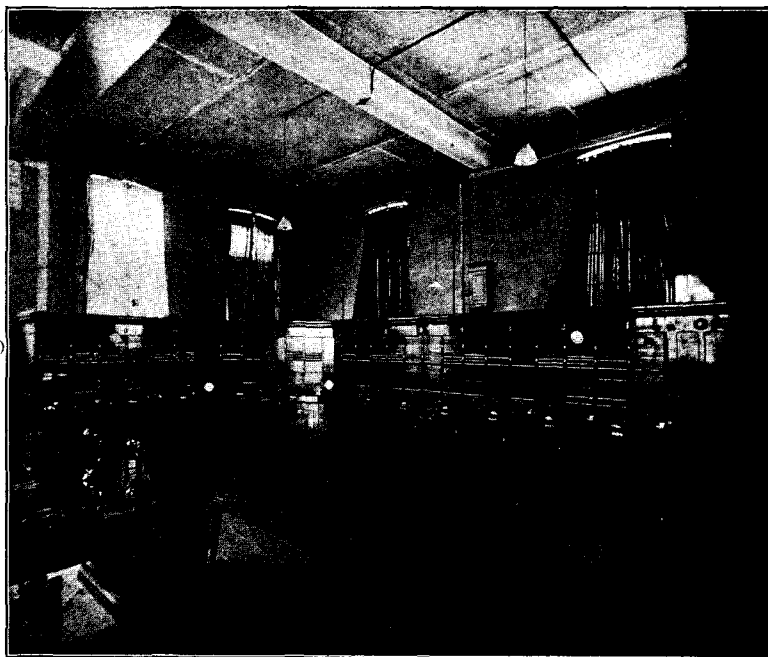
It was decided that efforts should be made at the outset to give the subscribers a "no delay" service on short distance trunk lines, and therefore six positions were fitted. In addition, three special control positions were established for long distance calls which could not be completed on demand, and three incoming positions for all incoming trunk calls. As will be understood the subscribers' and junction circuits are held for a longer period under a no delay system than under the record system, and it was necessary to ascertain the number of additional circuits that would be required from each of the local exchanges in order to provide for this prolonged occupation of such circuits. After a study of the number of originated trunk calls and their duration, it was estimated that an increase of circuits from 17 to 32 would meet the case, and that increase proved sufficient. The 32 lines were distributed on the six new positions.

Apart from the transfer of the trunk circuits to the new manual positions for which trunk traffic records were required, it was necessary that the subscribers' busy-hour calling rate should be ascertained for the purpose of fixing the loads to be carried by the various automatic units. This was obtained at three separate periods, the records being taken for the six working days of the

week in each case. It was also necessary to divide the subscribers into the following classes, i.e. :—

- (a) Subscribers with private branch exchanges.
- (b) " with auxiliary lines.
- (c) " and call offices with coin boxes.
- (d) Party-line subscribers.

A number of subscribers had a line or lines on the Post Office exchange and also on the ex-National exchange, either at Dock



MANUAL EXCHANGE FOR TRUNK AND JUNCTION CIRCUITS.

Street or Maindee. In order that such lines should be treated as one group and thus full use made of each line, special lists were prepared giving this information. The procedure adopted was to introduce a numerical list of the existing subscribers on each exchange in the following form :—

1.	2.	3.	4.	5.
Present No.	Proposed No.	Name.	Address.	Remarks.

The particulars for columns 1, 3, and 4 were entered some considerable time ago and agreed with the records in each exchange as to the number of working lines. It was necessary to amend this record month by month until the transfer, and although the work involved was considerable, experience showed the usefulness of the method adopted. Column 2 was not made use of until all preliminary matters had been finally settled. As a matter of fact it was left until the loading of the units was carried out.

Having obtained the originating traffic, it was arranged to spread the whole of the ordinary lines over the thirteen units set apart for this class in equal proportion. Thus approximately 87 lines per unit with an average load of approximately 80 calls per busy hour per unit was worked to. Two units were set apart for coin box and party lines. The most important matter for consideration, however, was the loading of the private branch exchange units; and with a view to providing for contingencies that might arise in connexion with the incoming traffic as compared with the outgoing, a limited amount of cross-connexions was provided between these units. The busiest subscribers, or the subscribers with the largest private branch exchanges, were connected with two special units having 20 per cent. junctions. The preliminary loading figures for originating traffic was therefore set out approximately as follows :—

- (a) Two 50-line units with 20 per cent. junctions, 70 lines, 227 calls.
- (b) One 50-line unit with 10 per cent. junctions, 34 lines, 113 calls.

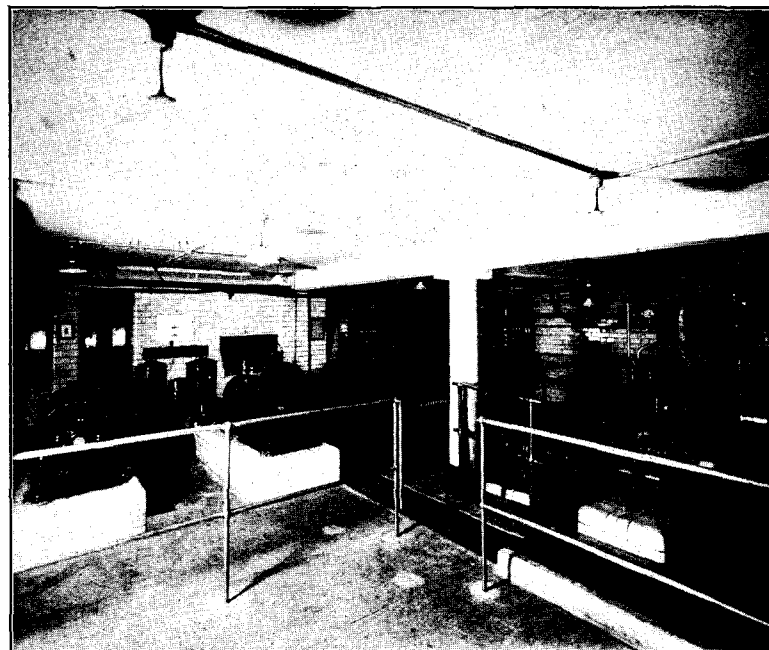
- (c) Two 100-line units with 10 per cent. junctions, 98 lines, 230 calls.

After fixing up these units to carry this load of originating traffic it was thought that, by cross-connecting a fair proportion of these lines over the line switches of the five units mentioned, the incoming traffic would be provided for. The approximate figures arrived at were :—

- (a) Two 50-line units, 20 per cent. junctions, 60 lines, 304 calls, or 152 per unit.
- (b) One 50-line unit, 10 per cent. junctions, 33 lines, 88 calls, or 88 per unit.
- (c) Two 100-line units, 10 per cent. junctions, 109 lines, 178 calls, or 89 per unit.

It might be interesting to mention at this stage the special feature of the units set apart for the private branch exchange, or auxiliary line subscribers. In most exchanges with an up-to-date multiple, consecutive jacks are used for the lines connecting private branch exchanges with the public exchanges, so that the operator can readily find a disengaged line by testing from left to right and may test all the lines in the group before giving the reply "Number engaged." It is therefore necessary to provide similar facilities in automatic working. This is done on certain specified units by arranging that when a subscriber dials the first number of a private branch exchange group, the selector automatically picks up the first disengaged line, or, if all lines are engaged, it connects the busy-back or engaged signal.

The next question was the arrangement of coin box and party line stations, and as two 100-line unit were set apart for this, the loading was carried out in the same manner as for ordinary units. The suggestion to place coin box and party line stations at Newport on the automatic switches and not on the manual boards was in the nature of an experiment. The 10-party line circuits were converted to 2-party line circuits, the "X" subscriber being connected with one unit and the "Y" subscriber with the other, although both subscribers were connected with the same switch so that they could not use the line at the same time. As regards reverting calls, i.e., calls from one station to the other station



POWER ROOM.

on the same party line circuit, calls can only be completed by the subscriber dialling "O" and getting the operator to connect them.

Automatic switching in connexion with circuits fitted with coin boxes* gave rise to the interesting problem of how to ensure

[* Note.—Call office lines at Newport were transferred to the manual board in connexion with the Budget changes, in order to ensure payment of the increased call office fees.—Ed., "T. & T. J."]

the payment of the fees. The problem would have been met by an arrangement for reversing the current and thus cutting off the transmitter until the 1d. was inserted in the coin box. This system would no doubt work satisfactorily when *all* callers get used to what they have to do; but there seems to be room for improvement in the design of this box. The idea underlying the automatic telephone is that anybody can use it on account of its simplicity and that foreigners without a knowledge of English will



SELECTORS.

be able to obtain connexions easily. The coin box however is not simple but complicated, and for the casual user may prove a source of annoyance.

Incoming Junction Calls.—A further experiment has also been tried at Newport, all incoming and both-way junctions being connected with the automatic units and dials fixed at all the sub-exchanges. The operators at the sub-exchange when dealing with a call for a Newport subscriber thus obtain any subscriber (without the help of the Newport operator) by plugging into the junction, holding over a special key and dialling the number required. Only outgoing and both-way junctions are therefore connected with the outgoing junction multiple, and in the case of the latter, as soon as the distant operator plugs into the line the engaged signal automatically appears on the outgoing junction multiple.

Phonogram or Express Services.—Arrangements were made to provide these services automatically by fitting up a number of instruments on the special private branch exchange units, so that when a subscriber required the phonogram section and called the specified number (2201, which is indicated on his instruction card), he was connected with one of a series of lines set apart for this class of work.

Before the transfer to automatic working at Newport a staff of service inspectors visited the subscribers' offices and thoroughly explained the working of their new instruments to the subscribers. Unfortunately the time was not sufficient to enable a visit to be made to each subscriber, but only 72 subscribers were missed. During this period exhibition instruments were fitted in the Dock Street offices and a notice appeared in the daily press advising subscribers that they could see the new instruments actually working. It is fully recognised that these steps had a very great influence in securing a satisfactory transfer. Many of the subscribers expressed their appreciation of our endeavours to give them all the information possible. The following "Don'ts" proved useful :—

1. Don't forget to lift receiver before calling.
2. Don't replace receiver when the called subscriber replies, or leaves the telephone to make an enquiry.

3. Don't touch the dial after the number has once been set up, or during conversation.
4. Don't touch the switch-hook after the number has been set up or during conversation unless it is desired to sever the connexion.
5. Don't hold the connexion when the busy-back signal (intermittent buzz) is received after a number has been set up. Someone may want to call you, and they will get the busy signal.
6. Don't forget to give your own number for every trunk call.
7. Don't fail to place the finger in the right number, and don't let go until the stop is reached; *i.e.*, don't pull the dial from "O" to the digit required.
8. Don't dial a number a second time immediately after the busy signal is received. Wait a minute or so, and the second attempt will then have a better chance of being successful.
9. Don't dial the units digit first, then the tens digit, &c. Commence with the first digit on the subscribers' number.
10. Don't ask for Maindee or Post Office but only the number in the Directory.
11. Always replace receiver after completing conversation, and take receiver off again before dialling for another number.

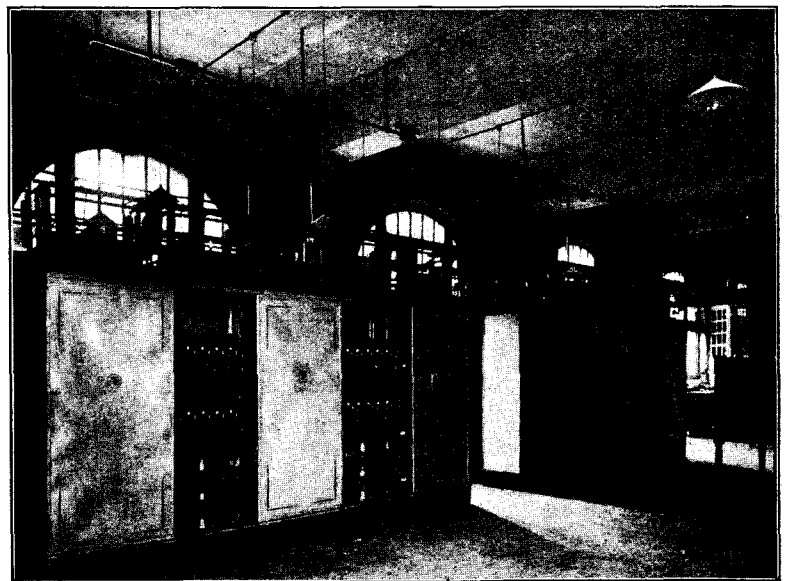
The testing of subscribers' circuits by the operating staff commenced about one hour after the transfer, and, as it was known that only a limited number of subscribers could be obtained on Saturday, the tests were continued on Monday with the following results :—

No. of lines actually tested ...	...	1,283
Lines found to be in order ...	...	930
Percentage on total lines ...	...	73
Dockets issued for "No replies" ...	...	353
Percentage on total lines tested ...	...	27

Of these dockets 294 were tested O.K., *i.e.*, 83 per cent. of the dockets issued.

59 faults were registered, *i.e.*, 17 per cent. of the dockets issued.

After the transfer the service inspectors visited subscribers who did not appear to understand the use of the dial, including the



LINE UNITS.

72 subscribers not previously visited. On the fourth and fifth day after the transfer six of the service inspectors were employed making actual service tests from subscribers' premises, and the results obtained were as follows :—

Total calls made	...	...	319.
Average time—	Seconds.		
Subscribers dialling	...	6.45	
.. getting busy-back	...	8.8	Including time occupied dialling.
Local subscriber answers	...	19.9	Ditto.
(Call abandoned). No reply...	...	86	Service inspector held lines in order to give thorough test to ringing current, which appeared to go out satisfactorily.
Total subscribers visited	...	...	170
			Per cent.
145 satisfied subscribers	...	...	85.3
19 fairly satisfied subscribers	...	...	11.2
3 dissatisfied subscribers	...	...	1.75
3 indefinite subscribers	...	...	1.75
170			

It is very satisfactory to note that out of 170 subscribers tested 96.5 per cent. of them express themselves as satisfied or fairly satisfied, especially when it is realised this result was obtained after only four days' working of the new system.

A further test was taken by one service inspector covering a period of five days (after the automatic system, had been working for about ten days), with the result that the whole of the subscribers visited expressed themselves fully satisfied with the service under the new conditions.

Staffing of the Exchange.—It will no doubt be interesting to most of the administrative and traffic officials to learn that the staffing of the new exchange at Newport shows a reduction of approximately 16.5 telephonists, as the following figures will show viz. :—

Prior to Transfer—	Super-visors.	Opera-tors.	Message room.	Ctk'r opera-tors.	Night opera-tors.	Total.
Newport Post Office						
Exchange...	3	17	6	—	—	26
„ Dock Street...	1	16	—	—	3	20
„ Maindee ...	—	2.5	—	1	—	3.5
	4	35.5	6	1	3	49.5
Required after Transfer—						
Provisional proposals	4	23	6	—	—	33
Saving in staff of ...	—	12.5	—	1	3	16.5

The day staff are taking duty from 7 a.m. to 10.45 p.m., and the all-night duty is being done by one male operator. It is quite probable that a further reduction of two or three operators will be possible in the near future.

POST OFFICE RELIEF FUND.

The Post Office Home Hospital at 20, Kensington Palace Gardens, W., has for some time past been continuously filled with wounded Post Office servants; but, notwithstanding the steps which have been taken to make the existence of the hospital as widely known as possible among Post Office servants with the colours, cases arise in which they either do not know of the hospital or are unaware of the action necessary to obtain transfer. Attention is therefore once more directed to the following instructions :—

Any wounded Post Office servants, in either naval or military hospitals, desirous of being transferred to the Post Office Home Hospital or the Convalescent Home at Littlestone-on-Sea, should apply to the Officer-in-Charge of the hospital where they happen to be and request him to communicate with the Lady Superintendent at 20, Kensington Palace Gardens, W. (Telephone No. Park 2361). If delay or difficulties arise after this has been done, representations should be made to Mr. A. G. Ferard, honorary secretary, Post Office Relief Fund, St. Martin's le Grand, London.

It is hoped that every opportunity will be taken by local committees to convey the above information to wounded Post Office servants, either direct or through their relatives.

THE DAWN OF TELEPHONY IN BIRMINGHAM: A FEW EARLY REMINISCENCES.

BY ARTHUR E. COTTERELL.

(Continued from page 26.)

IN 1881 the Provincial Telephone Company was formed to acquire as many as possible of the local companies which existed in various parts of the country, including the Midland Company. In the same year the National Telephone Company came into being and absorbed the Provincial Company.

Under the more powerful National Company things began to move more rapidly. At the outset three great changes were introduced. Bronze wire (No. 18), weighing less than 40 lbs. per mile, took the place of No. 11 iron, weighing 200 lbs. per mile, the introduction of which greatly facilitated the work of the wayleave canvassers who had hitherto met with no little opposition to their requests for permission to attach heavy and unsightly wires to the chimneys of various property owners.

The second innovation was the substitution of magneto bells for the battery ringing hitherto employed.

The third, and by no means least important step, was the provision of a shelf or table in front of each of the switchboards, on which were mounted a number of operating keys and cords, and the sweeping away of the old operating tables with all their complications and consequent delays. This new arrangement, introduced by Mr. W. B. Palmer, an American manager we had for a short while, was simple and on the whole effective, and a long way approach towards later day practices, the principal defect being the uncertainty of back contacts exposed to the dust; such contacts being of a dead rather than a rubbing character. The introduction of the magneto system raised at this early stage the need for a running generator at the exchange, and water power was first resorted to but proved somewhat costly, and as an alternative it was arranged with a neighbouring printer for a generator to be connected up to his machine shafting for a modest annual rental, hand generators being resorted to at such hours as the machinery was not running. Mr. Palmer's sojourn in Birmingham was brief, he being succeeded within a few months by Mr. W. Ker, who remained for about a year when he left to take up a similar but more important position in the United States. On Mr. Ker's retirement the control of the Birmingham district was placed in the joint hands of Mr. Ryder, the Secretary, who controlled all the commercial side, and Mr. John Walton, an ex-Post Office Engineer, who took charge of the engineering side.

Although rather out of sequence it will simplify my story if I say here that after the lapse of a year or so, on the retirement of Messrs. Ryder and Walton, it was decided by the then General Manager, Mr. J. C. Chambers, whose office was in Leeds, that it would be better to revert to a single control under a younger man, and his choice fell on Mr. W. L. Bishop, another American who had for some time past been District Manager in Bradford.

In 1882 an exchange was opened in Walsall and joined to Birmingham by means of trunk lines rented from the Post Office. This reminds me of the rather humorous opening of several other exchanges in the Black Country district, viz., at Dudley, Stourbridge, Brierley Hill and Wednesbury. It was necessary in order to secure the licenses that these exchanges should be opened within a given time. The necessary support not being immediately forthcoming, arrangements were made with two firms in each of these small towns to allow instruments to be fixed on their respective premises, which were joined by lines led on to a simple two-way switch screwed on to the window frame of a room rented in the particular town. Thus in each of these towns was provided not less than two "subscribers" (sic) and a suitable switching apparatus. How far the "exchanges" were used must be felt to the imagination, but I may recall one of the cases where the firms so joined comprised an iron foundry and a wholesale drapery establishment. This particular exchange system was one of the three which were erected

SIEMENS

CABLES & WIRES

of every description.

TELEGRAPH

Apparatus.

TELEPHONES

Manual & Automatic.

BATTERIES

Fluid & Dry.

MINE & RAILWAY

Signalling Apparatus.

LINE MATERIAL

ETC.

SIEMENS BROTHERS & CO., LTD., WOOLWICH,

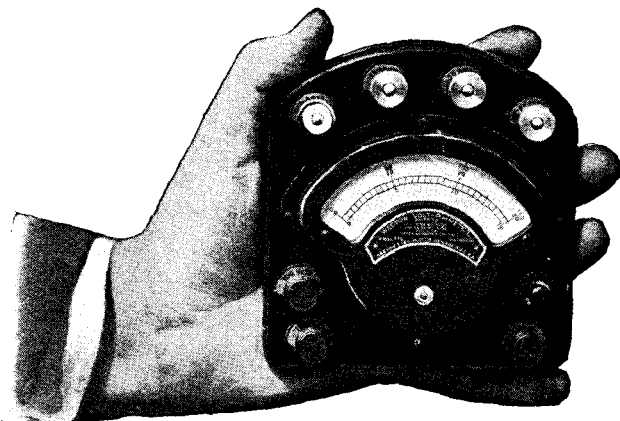
Telegrams: "SIEMENS, WOOLWICH."

OVER 4,000 EMPLOYEES.

Telephone: CITY 6400 (7 lines).

WESTON

Miniature Precision D.C. Instruments



MODEL 280 VOLT-AMMETER.

This series of Portable Miniature Instruments comprises Milli-voltmeters, Mil-ammeters, Single, Double and Triple-range Voltmeters, Ammeters and Volt-Ammeters.

DELIVERY FROM STOCK.

WRITE FOR LIST D3.

WESTON ELECTRICAL INSTRUMENT CO.

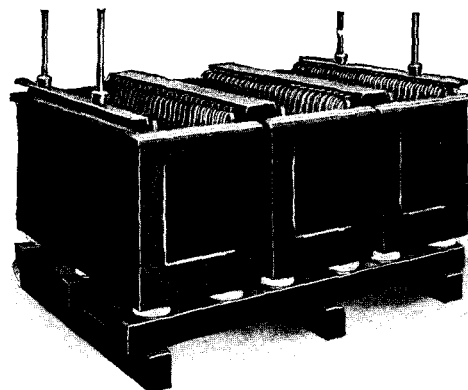
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

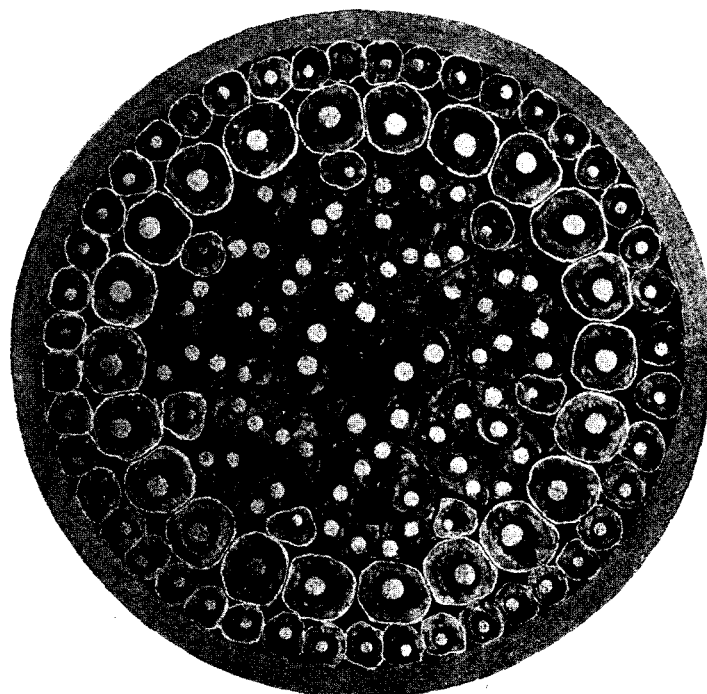
DRY CORE TELEPHONE CABLES.

*Electrical Plant of every description
for Power, Lighting, and Wireless
Installations.*

JOHNSON & PHILLIPS L^{td}

CHARLTON, LONDON, S.E.

ESTABLISHED 1875.



by myself, as I had by this time been transferred from the clerical to the electrical side, much to my satisfaction.

And here with this personal reference I should like to recall with no little gratitude the encouragement which I received from the then Chief Engineer of the National Company, the late Mr. W. F. Bottomley. He was a great enthusiast in telephone matters and was often experimenting on induction and anti-induction methods, and came upon the horizon largely as one of the inventors of the twisted arrangement for loop circuits already referred to. In any case he was ever ready to tell me all he knew, always chose me to assist in his experiments in Birmingham which were frequent, and his invariable kindness is a pleasant memory.

About the year 1883 the Company decided to run trunk wires of its own from Birmingham to the Black Country towns of Wolverhampton, Walsall and Wednesbury.

The idea was excellent but the officer responsible for the arrangements made a woeful blunder owing to an attempted cuteness apparently in excess of his engineering knowledge.

The Post Office used two arms in order that the wires of a loop circuit might revolve on the twist. Perish the thought! Such waste of stores could surely be avoided by using "J" insulators below the arms as well as the ordinary upright ones above, and thus the wires could be arranged to revolve just as though two arms had been used.

What happened might well have been foreseen. Under strain the "J" insulator bolts turned in their holes not only when the wires were undergoing regulation but also with any displacement of the poles, and frequent contacts between line wires and insulator bolts took place. This defect was partly met by the substitution of an inverted form of insulator which however was by no means efficient, particularly in wet weather, and moreover the wires were badly spaced.

The next development was the opening in 1884 of the Jewellers Exchange in Frederick Street. The members of the jewellery trade, a large industry in a compact area, desired a purely local service, and about 70 or 80 signed *en bloc* at a special rate of £11 per annum within a quarter of a mile. The use of one junction wire to the main exchange was allowed "by courtesy," it being represented that many of these subscribers were members of city clubs for lunching purposes.

A host of memories of persons, doings and incidents crowd into my mind, but with the limited space at my disposal I am constrained to content myself by seeing these phantoms pass by. I have, moreover, arrived at a juncture when telephony was being placed on firmer ground, and I have thus other things to relate. Up till then we had been feeling our way through an unknown thing and were only awakening to some of the sterner realities, and I think that the movements about the year 1885 must have been very considerable. Perhaps they were the more impressed upon me owing to a hiatus in my own service. In October 1884 I had resigned my position as Chief Inspector from a feeling of dissatisfaction with my then prospects. In the early part of 1886 I was, however, approached by the newly appointed General Manager for the Midlands (Mr. Coleman) who offered me the position of Manager in the Potteries, which I accepted, receiving promotion to the managerial position in Birmingham three months later, thus succeeding Mr. Bishop. What first impressed me was the enormous improvement and order in methods observable under Mr. Coleman's *regime* in the engineering section.

I well recall Mr. Coleman's remark at our first interview, and which he often reiterated, "I attach very great importance to good construction." It is not the purpose or within the scope of this article to dilate on personalities, indeed I have been careful to refrain from doing so, but this I can at least be permitted to say that the National Telephone Company had in Mr. Alfred Coleman an officer of conspicuous ability, untiring energy and high moral courage, a man for whom no obstacle seemed too great or detail too small; who ruled his staff with a strong hand and yet was mindful of their interests and just in his dealings. I speak as one who stood officially nearest to him in Birmingham for over 22 years and therefore should be competent so to speak.

As I am writing about Birmingham I pass over my experiences

in the Potteries and the vagaries of the call wire system then in vogue there.

Birmingham at this time, 1886, had 312 subscribers on the Central Exchange spread over half a dozen switchboards, which were connected by junction or transfer wires.

The greatest change in progress was the reconstruction of the line work throughout the district. The whole of the straggling and unsatisfactory overhouse work was being swept away and replaced by strong pole routes.

Several branch exchanges had been established and call offices had been opened in various places, whilst every kind of new apparatus or principle received careful attention and had its practicability studied. Amongst these was the multiple switchboard which was installed at the Central Exchange in 1887.

The adoption of the "Coleman and Brown" indicator relay, used on many of the switchboards, ensured a reliability which was sadly wanting in the old systems where the night bell circuit depended on such contact as was derived from the indicator flap falling on to a stretched wire, a contact which was absolutely unreliable for several obvious reasons.

The annual subscription for an exchange connexion within one mile of an exchange had been for some years past £15 in Birmingham and £10 in the Black Country towns of the three adjacent areas known as Wolverhampton, Walsall and Wednesbury, and the development had been on the whole slow. Mr. Coleman proposed in 1887 and, with the consent of the Directors, carried through a scheme which was destined to give considerable impetus to the business. This was the establishment of a district rate giving unlimited service throughout the whole of the four areas at a rental of £15 *ls.* per annum if within one mile of an exchange. The local rates were also continued as above and there was added a special district rate of £20 *ls.* which included the contiguous area of Kidderminster, where a thriving local exchange had been established. These district rates were very well received in Birmingham where the extra charge for speaking to the Black Country was thus merely nominal, whilst in the Black Country towns the power of compounding the trunk fees which had previously been introduced was much appreciated.

The policy of establishing public call offices being then much to the front, the writer invented a simple form of coin box so arranged inside that pennies or sixpences in running down their respective shoots struck in passing different toned gongs, the sounds of which were readily heard and distinguished, being acoustically conveyed to the listening operator by means of the ordinary transmitter and speaking circuit. The shoots were so arranged that smaller coins missed the gongs. The addition of hammer arrangements operated by pass keys for local and district services respectively enabled subscribers to have free use of these call office services. My devices for this latter purpose were subsequently improved upon by Mr. Coleman.

This form of call box, though like others open to some objections, was found to be simple and effective as a whole, and was very largely used for some years throughout the Midland counties particularly.

The next step, and that one of great importance, was the erection of trunk lines to more distant towns. Two loop circuits (100-lb. copper) were erected between Birmingham and Sheffield, one of the circuits being cut at Derby to form Birmingham-Derby and Derby-Sheffield circuits. Two more circuits (150-lb. copper) were run from Birmingham to London. Owing to wayleave difficulties they were stopped at Edgware Road in January 1890, but on July 10, 1890, they were extended to the Oxford Court Exchange in London, and telephoning between London and Birmingham was thus an accomplished fact.

Trunk lines were also run to Liverpool, Manchester and to the western counties under joint arrangements with the various other companies, all of which finally led up to the great amalgamation in 1889 whereby the United Company in London (which was the parent company) and the Lancashire and Cheshire Company became merged into the National Telephone Company, which later on absorbed the remaining companies, the more important of which were the Western Counties and South Wales, the South of England, the Northern and the Telephone Company of Ireland.

Meanwhile considerable improvement had been made in the form of telephone cables, and several sections of Patterson's cable were laid in Birmingham. These cables, which comprised cotton covered copper wires soaked in paraffin and sheathed in a water-tight lead piping, were a distinct advance on the gutta percha or rubber covered cable hitherto used for several reasons, particularly in regard to the quality known electrically as the "capacity."

A still further advance, viz., the introduction of dry paper instead of "the cotton and paraffin" was quickly taken advantage of, and the convenience and advantages of the same brought well to the front the prospect of ultimately providing metallic or twin circuits in place of the single wire earthed circuits which had served for so many years, but which with the growth of the business were more and more subject not only to telephonic induction but to disturbances arising from the development of other electrical enterprises; whilst the compactness and efficiency of these dry core cables met the demand which was becoming urgent for a system of supply of a far greater magnitude than could be satisfactorily afforded by aerial routes.

At the close of 1889 there was started a telephone society amongst the local staff in Birmingham, and the author may perhaps be pardoned for taking pride in the fact that this, the first of the many telephone societies now existing, was the outcome of an idea which he had repeatedly urged for some time previously on the staff.

In 1890 the patents expired. Hitherto the various local companies had paid a heavy royalty to the United Company, which owned the patent rights in the United Kingdom. With the cessation of the patent and the royalties thereon came the opportunity, not to say the necessity, for reducing the telephone charges. As from Jan. 1, 1891, the charge for unlimited local service in Birmingham was reduced to £10 per annum if within one mile of an exchange, whilst in the Black Country areas the charges were £8 within half a mile, £9 within three-quarters of a mile and £10 for the mile. The rates on the Jewellers Exchange were reduced to the same as the Black Country towns with the added advantage of a £7 rate within the quarter mile; the £10 rate obviously carrying with it the full exchange advantages.

The district rate was practically unaltered at £15 by the mere knocking off of the odd one shilling.

(To be concluded.)

TRUNK FEE ACCOUNTS.

THE questions of the form of this account and the details it should contain have often been discussed.

The horizontal cast required in the present form is inconvenient and a trial is being made in half a dozen districts of a new form of account with vertical columns.

Details of each item will not be shown, but the number of trunk calls, telegrams, &c., and their total value for each day will be given under four headings, Trunk Fees, Telegrams, Postal Facilities and Junction Fees.

The vertical casting should be more convenient and tends towards accuracy.

In appearance the new form is an improvement on that at present in general use, and if in practice it is found to meet the requirements of subscribers and to be convenient to the Department's officers its adoption will be made general.

V.

LONDON CONCERT IN AID OF WAR CHARITIES.

An evening concert in aid of War Charities was arranged by Miss Gladys Crompton, of Miss Heap's office, and held on the afternoon of Saturday, Nov. 6, at the Cripplegate Institute. Miss Crompton had arranged an excellent programme, and the artistes included Miss Gladys Crompton (soprano), Miss Florence Wyatt (contralto), Miss Frances Wood (elocutionist), Mr. Wm. Vincent (tenor), Mr. John Jacob (baritone), Mr. Wm. C. White (violinist), and Mr. Hal Burte, who accompanied and also gave songs at the piano. Each item was thoroughly enjoyed by an appreciative audience, and many encores were given. Miss Crompton is also to be congratulated on the excellent financial results, the proceeds amounting to £10. This sum has been divided between the P.O. Relief Fund and the P.O. Ambulance Corps, and cheques for £7 and £3 respectively have been forwarded.

SOME NOTES ON WIRELESS TELEGRAPHY AND THE WAR.

By B. S. T. WALLACE (C.T.O.).

"How fast can you receive?" "Thirty words a minute, sir," modestly replied the pale-faced youth from the C.T.O. "Thirty words a minute!" ejaculated the bronzed and breezy naval lieutenant, "You mean thirty letters a minute." So runs a story of the early days of enlistment of telegraphists into the Royal Naval Division.

It may be true or it may not, but among land operators the impression is still widely held that naval telegraphy and wireless telegraphy generally is still in the happy days of ten to fifteen words a minute. No greater illusion could be held, and it is my object to give a rough conception of modern wireless working together with a few notes on its application to the present European operations.

For some years past, wireless reception has almost exclusively been carried on by means of telephone receivers, the signals being formed by long and short "notes." The "note" is the sound made by the spark at the distant transmitter, which in modern apparatus is a distinct musical tone varying in pitch and quality with the particular spark discharger in use.

Wireless signals are easier to read and learn than the sounder.

There is no limit to the speed of working except that introduced by extraneous causes and local circumstances. In time of peace it was quite the usual thing to hear a naval operator at Malta, for instance, sending to a home station at a smart 30 words per minute. Indeed, the working of the naval telegraphists was always a model of perfection and entirely free from the petty bickerings and irregular remarks indulged in on certain other systems of telegraphy. Commercial working is carried on at very much the same rate as over the ordinary land lines, i.e., it largely depends on the mood of the operator. He always rises to the occasion, and in times of mishap, such as when the *Majestic* collided with H.M.S. *Hawke*, 45 to 55 messages per hour is the usual sequel.

The mercantile system is well leavened with old Post Office telegraphists, so much so that a Dutchman at Scheveningen, or even the officious Hun at Norddeich would very placidly introduce a remark with "I sa o m" or conclude with "Rt o tks."

Sending among a group of wireless stations is like talking to a roomful of people; everyone within earshot can hear what is being said. This, despite care and organisation, frequently gives rise to serious interference—"jamming" as it is termed—when several stations comparatively near together are working simultaneously. It has the one advantage however that a distress call cannot fail to be heard by a large number of stations over a wide area.

Various groups of ships and stations are allotted different wave-lengths or tunes, partly to minimise interference and also because certain wave-lengths are better suited to certain special conditions of country, distance, and power used. Thus, a commercial ship is tuned to 600 metres, and normally is only heard by other stations whose receiving apparatus is similarly adjusted. There is, however, a certain amount of overlapping and stations with differing wave-lengths will interrupt each other when sufficiently near together. Again, complications sometimes arise from the presence of certain harmonic effects. As may be imagined, the sound in the receivers is at times very much like a musical box playing several tunes at once. The expert operator can frequently pick out any one of several stations working simultaneously and read it without difficulty.

In due course it will probably be revealed that wireless telegraphy has dealt some master strokes for our Navy, which, it is unnecessary to hint, possesses the most efficient wireless apparatus extant. Any British warship on the seven seas can always be communicated with in a few minutes.

Next in importance to acting as the spinal cord of the Navy, wireless now enables our artillery to "find" the hidden enemy visible from warplanes which signal his position. Communication

between airships and land and *vice versa* is accomplished with as much ease as between ship and shore. A few years back the writer from his home in London kept in touch with the small British airship *Delta* travelling from Norwich to South Farnborough. Transmission from an aeroplane is simple, but reception is a problem, owing to the overwhelming noise of the engine and propeller. The operator cannot be put in a silent cabinet, so recourse is had to Mr. S. G. Brown's famous relays and the signals intensified. At least two relays in cascade are necessary, and signals must be clear and strong.

With the armies in the field will of course be numerous portable wireless stations of incalculable value for combined movements and a rapid advance, such as we all hope for when our armies cross the Rhine. They are carried on powerful motor cars and can be put in operation in a few minutes.

While experimenting in Bradford, Yorkshire, two years back, I was able, using the apparatus illustrated, to pick up and keep in touch over a period of several hours, during the middle of the day and free from interruption, with one of these installations working in Hampshire nearly 300 miles away. This will give an idea of their range and efficiency. Here is even a better illustration, an authentic incident. A field-set near Aldershot using code "F P" was one day calling "F L" another military station twenty miles away. Now "F L" is also the code of Paris, and *Paris answered this call*, intimating that signals were very weak. This episode was intercepted in London.

It might here be mentioned that the day range of a wireless station is usually about half its night range.

The chief natural difficulty affecting wireless working is the interference caused by atmospheric electricity of variable origin and effect. This trouble is always present when apparatus is adjusted to the longest wavelengths used in transatlantic working, and periodically effects the shorter waves.

It comes as a series of "sizzlings" and "growlings" which cut up or drown the Morse signals. It is somewhat analogous to heavy induction on telegraph and telephone circuits. There is no complete and satisfactory remedy for it, most ideas and suggestions to this end all having the one great failing: they eliminate the signals more readily than the interfering "atmospherics" or "X's" as they are termed.

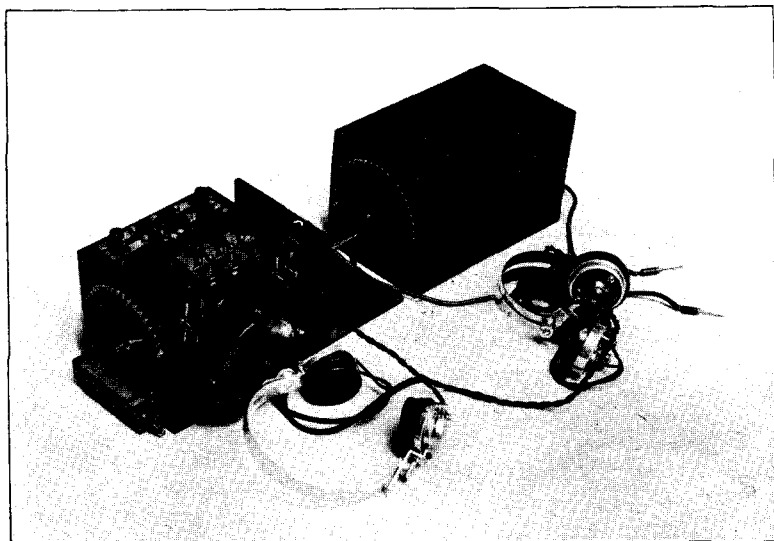


FIG. 1.

Wireless telegraphy has been credited with having provided greater and more wonderful "maritime" stories than even fishing, but the war has killed any romance and surprise that might have still remained, and the feat recently announced: that Arlington, U.S.A., had spoken by wireless telephony to Paris, is passed as a cold fact.

The illustrations show some of the writer's apparatus, now in

the charge of the P.O. It was designed for very high efficiency in order to compensate for the limited height of aerial usually attainable on the premises of an ordinary suburban residence. It is built almost entirely of ebonite and wired with double silk-covered wire coated with shellac. The receiving set shown in Fig. 1 comprises oscillation transformer and aerial tuning inductance, both adjustable to an approximate wavelength of 10,000 metres.

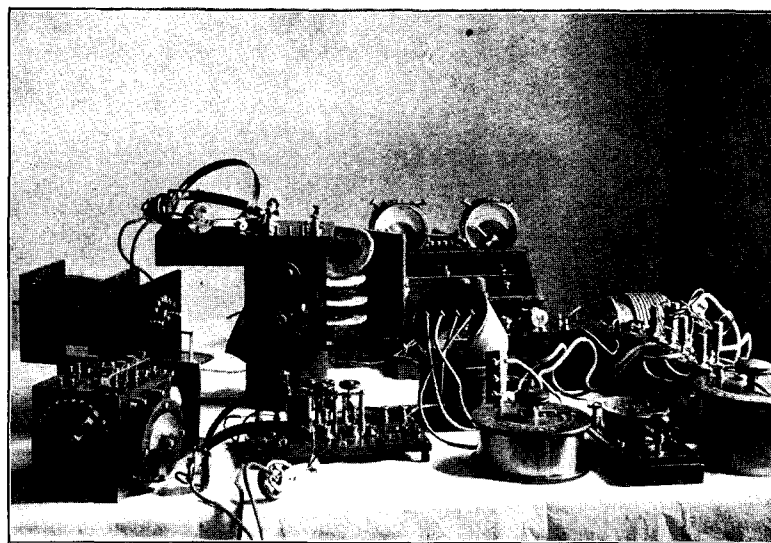


FIG. 2.

The detectors employed are carborundum, and zincite—tellurium.

Telephone receivers used for wireless work are considerably more sensitive than the ordinary receivers, the most comfortable and efficient being those invented and designed by Mr. S. G. Brown, one of which is shown to the left in Fig. 1. They are built on the reed principle, and the vibrations are transmitted to and made audible on a fine parchment cone.

The range of a wireless station is dependent very largely on the height of the aerial wire and the nature of the surrounding country. The set shown in Fig. 1 has from London occasionally read Glace Bay, Newfoundland, during hours of total darkness across the Atlantic, Malta during daylight, and frequently picked up incoming liners while still 700 miles west of the Lizard.

THE WORK OF THE WOMEN OF THE LONDON TELEPHONE SERVICE IN WAR TIME.

By A. A. HEAP (*Female Superintendent, London Telephone Service*).

I THINK it will interest some of the readers of this JOURNAL to hear of the charitable work done by the women of the London Telephone Service since the war broke out. Directly it was declared, every woman asked herself and others, What can I do? but at first no one knew in which direction to turn her energies. A lead was given by Mrs. Hobhouse, who suggested that the staffs of the different departments might like to work for Queen Mary's Needlework Guild. Following this suggestion, a meeting of supervisors and telephonists was held in the dining-room at G.P.O. South and was attended by about 200 representatives from different exchanges in the Metropolitan area. After some discussion it was decided to work for the hospitals, for our soldiers, and for the widows and children of Post Office servants who had fallen in the war. It was also decided to send the articles made to Mrs. Hobhouse, either for direct distribution or for forwarding to Queen Mary's Guild. The supervisors who were present at the meeting undertook to lay the matter before their staffs and to give advice and help in the cutting and making of garments. The result has been most gratifying and the response of the staff far beyond expectation.

A second meeting was held at G.P.O. South in October of this year, and it was then possible to give some account of the year's work.

From that account it appeared that the various staffs had forwarded to Mrs. Hobhouse 4,150 garments, besides having sent 390 articles of comfort for our soldiers to other agencies specially dealing with soldiers' wants. Of the garments, nearly a thousand were for children, and, while all were practical, many were exquisite both in material and workmanship. Mrs. Hobhouse tells me she has found the children's garments most useful. This is easily seen from the fact that 59 widows and 317 children of Post Office servants have received a useful supply of garments from this store.

Last Christmas there were on Mrs. Hobhouse's list nine widows in London with four or more children. In addition to the garments sent by Mrs. Hobhouse, each family received a Christmas present from the exchange staff of the district in which they lived. The gifts generally consisted of one or more garments for each member of the family (not forgetting the mother) and a toy and sweets for each child. The givers derived much pleasure from planning and making their gifts, but the surprise and pleasure of the recipients was most touching.

One supervisor wrote:

"Dear Miss Heap,

I am writing to let you know in what way we have been able to help Mrs. H— this Christmas.

An article of clothing has been sent to each of the children, also a doll and stocking filled with toys. A hamper for Mrs. H— containing Christmas pudding, bacon, tea, cocoa, biscuits and fruit. She was very pleased and I am certain appreciates the gift."

In acknowledgment Mrs. H— wrote:

"Dear Madam,

With many thanks I acknowledge the receipt of a parcel of clothing from the London Telephone Exchange and will the committee accept my deepest and sincere gratitude. The children were delighted with the garments." Another widow wrote:

"Dear Madam,

I can hardly find words to express my thanks to you and all those who helped to provide such a splendid gift for my little ones and myself. Each garment fitted well, and chocolate, cakes and pudding were delicious.

I was very curious to know what the parcels contained but did not open them until Christmas morning came; it was as a great surprise and pleasure for me as for the children.

It was a pleasure to watch them and to hear the big 'Oh' as each parcel was opened. Their eyes were nearly out of their heads with excitement, and very little breakfast was eaten after a bar of chocolate was devoured and pronounced delicious.

Please give our hearty thanks to the ladies."

No doubt the gifts were useful but they served a higher purpose. They made these poor bereaved women feel that someone cared and that a very real sympathy was felt for them in their bereavement.

The Post Office Hospital in Kensington Gardens was not forgotten by the women of the London Telephone Service. One exchange sent a present of glass and cutlery for its equipment, followed later by a much-needed gift of drugs and bandages. In February, members of the staff gave a concert to the patients in the hospital, and an enquiry from the matron elicited the fact that the great want at the moment was warm underclothing for the men who were leaving the hospital. An appeal was made and sufficient money collected to send twenty woollen garments.

Later, a request for woollen socks for our prisoners of war in Germany was received from the Post Office Relief Fund. It met with a quick response, and Miss Loch, the Lady Superintendent of the Money Order Branch who undertook the work of forwarding them, tells me that with our help she is now able to send a second pair to each prisoner. It is comforting to know that they really reach the men they are intended for, and that in cases when the addressee has died the German authorities return the parcel intact.

Parcels of warm clothing have also been sent to the brave Alpini troops, and money has been given liberally to the various relief funds.

At the present moment most of the exchanges are busy working for the hospitals whose needs the Queen has placed before the workers of her Guild. Garments for women and children are also needed for the widows and children of our men who, unhappily, are still falling. Little boy's garments are specially needed. Unfortunately Mrs. Hobhouse is no longer able to undertake the work of collection and distribution, and she has asked me to take charge of the women and children's portion of it. At the present moment there are twelve families on my list for whom clothing is required, but the stock is exhausted. I shall be very grateful for gifts of warm clothing before the severe cold sets in. As I have no accommodation for storing I should prefer that each exchange should forward its own gifts, and I shall be glad to send the names and addresses of the families requiring help to any exchange that is in a position to supply garments.

I cannot close this paper without saying how much we all owe to Mrs. Hobhouse for her interest in the scheme and the practical help she had given us throughout the year. It is a matter for great regret that she is unable to continue it.

The work of the women of the London Telephone Service during the present crisis, has filled me with pride, but I do not offer them any thanks, for I know that whatever self-denial they have practised in money and in time they have been fully re-paid in the joy of giving. We have all learned in this year, if we had not learnt it before, that it is indeed more blessed to give than to receive.

TELEGRAPHIC MEMORABILIA.

"PUBLIC OPINION" is responsible for the following on "How Mr. Edison 'hears.'" As is well known the famous inventor is stone deaf, "Yet as chairman of the American Naval Advisory Board, he has been presiding over the meetings and following the discussions very closely. Mr. Edison has now let the public into his secret of how he is able to do this by explaining that it is due to a little wireless telegraph system in which an assistant is the operator. Both Mr. Edison and his aide are experienced in the use of the Morse telegraph code, and during the sessions of the board the latter sat beside Mr. Edison and ticked off the substance of the discussions and motions, sometimes upon Mr. Edison's knee and at other times on his wrist, at the rate of thirty words a minute."

The feasibility of this is well known to all experienced telegraphists, but from Mr. Edison's own country comes the rival story of two telegraphers who had acquired so accurate a control of the muscles of their eyelids as to be able to work these organs as a "double-plate visual" apparatus, the right and left lids being utilised respectively for bars and dots in a similar manner to the two plates of the now obsolete "double-plate sounder." Unfortunately it is not possible to quote so reliable a source of information as that which supplied the paragraph above, and the latter must therefore appear under the heading of "Traditions of the Service!"

* * * * *

It was unfortunate that there was so small a representation from the telegraph side at the opening meeting of the P.O. T. and T. Society. Undoubtedly war pressure and military duties had much to do with the paucity of the telegraph attendance, although these causes do not complete the tale. Perhaps it may be permissible to remind members that although the subject may be "only a telephone" one, matters respecting the welfare of the Telegraph Service are sure to crop up from time to time. This proved to be the case at the inaugural meeting when the Postmaster-General gave the presidential address and Mr. Dalzell provided the subject for the evening.

* * * * *

Further depletions of the telegraph staffs are close at hand, and it is patent to all that the telegraph side will suffer to a much greater degree than that of the more feminine telephone side. It

therefore behoves the remaining male members of the senior branch of the Service to put their willing shoulders to the "Society" wheel and to carry on worthily.

This leads a digressing pen to express the hope that the Department will not fail to call upon every member of the staff and supervision ineligible for military service to place *their* services at the complete disposal of the P.M.G. Much could be done in this respect by the suspension of all leave except of an emergency character and by a general spread-over of duties. It is not a time for the study of private convenience, but for the suspension of all petty rules and regulations and perhaps some rules that are not petty. Individual fads and fancies have no place in the economy of an empire engaged in a life and death struggle unsurpassed in history. The strange thing is that while you will find abstract agreement with the above in the case of 99 per cent. of the officials with whom one comes in contact comprising all ranks, yet generally we meander on in the old sweet way of vain attempts at "Business as usual."

Speaking to a member of one of the Allied Embassies only a week or two ago he put the direct question: "Is it true that you in the Post Office still have your annual holiday?" Somewhat shamefacedly the admission was made, and the retort came, "Scandalous!" Now without accepting that word as anything but an exaggeration of the actual situation, one must at least accept the impression created upon a member of an allied nation whose women have been unspeakably tortured, whose children have been shot down before their eyes, and miles and miles of whose land have been devastated. I have letters in my possession from engineers of certain Government factories abroad which literally have not ceased to turn out their products of war day and night since the fateful August of 1914, and these men cannot understand why we apparently take things so coldly. We are a curious *ununderstandable* race, even to ourselves, but the questions for those ineligible ones or those eligible but remaining at necessary civil posts in the Telegraph Service are surely "Are we doing all we might do? Is *our* output the maximum? Is *our* spirit of concession and the waiving of individual whims and fancies at its highest? Have *we* made any personal sacrifices of comfort or convenience? In one word, are we really 'War Mates'?"

An electrical contemporary taking a very keen interest in matters telegraphic, in reply to the attempted motto of "Business as usual," retorts "Neither in business or pleasure must things be 'as usual.' Realisation of war and its needs must be all pervading. It need not and must not induce gloom or pessimism, but only stern determination and active endeavour. 'Nothing as usual,' but carry on." Here we have the extreme outside view of "Nothing as usual" which at least has the merit of wholeheartedness and thoroughness.

However, fully convinced that both sides of a question should have fair play, it may solace some to learn that even within the gate of the enemy there are attempts at "Business as usual," for the following is extracted from an international technical catalogue:—"Vienna: *Post and Telegraph Magazine* Nos. 22-24, 'Machine or Multiple Telephony?'"

A friend retorted, "they have settled that in the army by having Hand Telephony," but this is not altogether the case, as news comes from the French lines of a mobile Baudot and Hughes apparatus carried about by the ubiquitous petrol-driven motor, in what my informant described as a "glorified pantehnicon."

The movement in favour of laying an Americano-Scandinavian telegraph cable, apparently to be indirectly subsidised by the German Government, appears to have been abandoned if it ever had any real intention of becoming an accomplished fact. In its place the establishment of a wireless telegraph installation between Karlsborg in Sweden and an unmentioned place in the States appears to have received the serious attention of the Swedish State Telegraph Company.

The C.T.O. branch of the Post Office Relief Fund recently issued an informative report on the local work done in connexion with this especial form of war relief work. It is not possible in cold print fully to convey the expressions of satisfaction and gratitude which have repeatedly come before the members of the

committee, or the more than gratifying independence of some of the applicants who gladly and almost prematurely re-paid monies which had been lent to them to tide-over until heavily pressed departments were able to settle legitimate claims.

One admits the complexity of our modern civilisation and the difficulty at times of determining what is specially a war-telegram, so intimately is one industry interwoven with another. A telegram, innocent looking in itself, may prove of the utmost import as between officials or even between private individuals who unknown to the telegraphist may be engaged on State service of the highest importance. Naturally there are other telegrams which are clearly and purely of a social nature and carry internal evidence well exposed. When, however, a company states that it is engaged on war work and it is discovered that the firm is engaged in making "jam-pot covers for the troops," one cannot but feel that there are indeed degrees of urgency even in war matters. Certainly no counter clerk need feel any qualm of conscience in omitting to insert O.H.M.S. from telegrams on this or kindred business, especially if un-backed by official authority!

It is noted from the contents of an official report of the Indian Government that the mixed postal and telegraph service between India and the United Kingdom shows signs of obsolescence owing to the growth of the system of deferred foreign telegrams. It will probably fall into complete disuse before long.

From the same report the following interesting remarks are re-printed for the benefit of wireless readers. "Great difficulty is experienced at times in maintaining communication during times of atmospheric disturbances." This is, of course, a common complaint, but the curious part of the paragraph is that which follows:—"At Calcutta disturbing conditions prevail from April to June, while at inland stations they extend over the months of May to August. . . . The disturbances are much more severe in the afternoon than in the morning and . . . at Bombay and Karachi they are usually less intense than elsewhere."

J. J. T.

THE SPIRIT OF ORGANISATION.

A PAPER was read recently by Mr. Dalzell before the Telephone and Telegraph Society of London, the subject being "Provincial Organisation and Development." The writer gave an outline of the organisation dealing mainly, as was his object, with the framework of the subject.

It is thought that as a natural sequence the present is an opportune time for considering the subject on the lines suggested by the heading on these notes.

Even where a machine has been perfectly designed and carried into execution—and this high claim is not yet made for the telephone organisation—it would be futile to expect smooth working without an ample supply of that lubricant which eases the movement of the wheels. No matter what amount of consideration may have been given to the organisation by its framers, without goodwill on the part of those who are working the machine all efforts will be vain.

An interesting statement was made at a recent meeting of the London Telephonists' Society as indicating what can be done with old worn-out plant when the "spirit" of the staff is right. The Bank Exchange, London, has been in existence for twenty years, and is due to be scrapped. It is of the magneto type with a flat board multiple, and yet an engineering officer volunteered the information that largely because of the excellent assistance given and helpfulness shown by the telephonists in the exchange there were fewer complaints from subscribers connected to Bank than from other and more up-to-date exchanges.

The object of these notes is to put in a plea for more of the human side in our treatment of the staff. The German Emperor a year or two ago in addressing a body of men said that at his command his men would be expected, if necessary, to shoot their own fathers and brothers. Our own King in the excellent speech which he addressed recently to the youth of the nation struck the human note in the words "In freely responding to my appeal you will be giving your support to our brothers who for long months," &c., &c. Can anyone doubt the relative effect of the two messages?

Some supervising officers adopt an attitude in relation to their subordinates which generates fear; a bullying attitude may appear to be successful, but it can never draw from those over whom it is exercised that quality of helpfulness and assistance on which a chief should be able to rely. One may be just and yet genial in one's relationship to those over whom one happens to be placed, and in the long run the office so controlled will figure among the "satisfactory" offices.

It is no doubt very difficult in a great organisation where the ramifications of the business are so diverse, and where the staff is composed of all sorts and conditions of men and women, to strike the happy medium, but an occasional recognition that we are all "John Thompson's bairns," and of the brotherhood that fact implies, is of the greatest service. When a time of stress arises and something more than the ordinary is required, the staff so treated—a staff whose self-respect has been carefully guarded—will respond to any appeal.

Another point of importance which should be emphasised is that of good will between the members of different branches of the Service. Before the transfer of telephones to the State the district organisation was such that one man was in control, and this no doubt had the effect of cutting down incipient trouble, as differences of opinion between members of his staff were composed at once instead of being allowed to grow. With the present functional organisation—the commercial and engineering officers acting under different chiefs—there is greater cause for friction and therefore a more insistent need for goodwill and a proper understanding.

Mr. Dalzell in his paper stated that "any arrangements by which the officers and staff can be linked together more closely are looked upon with favour," and that "conferences form an essential and valuable feature of the organisation." We of the Post Office are great adepts in the art of correspondence, but what an amount of friction would be avoided if personal conference were resorted to in greater measure. Engineering and traffic problems are closely related and the opportunity of frequent conference is sought by the most efficient officers. In a report made by officers of the Department who visited the United States and looked into the organisation of telephones there, the following sentence appears in speaking of the chief "plant" and "traffic" officers: "These two officers work in the closest possible association. They occupy adjacent and inter-communicating rooms and constantly discuss questions of equipment, operating method, and the like." The inter-communicating room interests me!

V.

THE TELEPHONE AT THE FRONT.

FROM "PUNCH."

DEAR MR. PUNCH,—I have not yet received my second pip. I know fellows who were gazetted days after me who have two, while I remain, in spite of my peculiar qualifications, a mere second lieutenant. Clarence, for instance, has two, and he merely lets out mo-bikes. As for explaining how a telephone works to a red-hat, why, he wouldn't know which end to speak into; and I don't think he ever bumps into the Staff at all.

On the other hand, I suppose I know more about the ways of Staff officers than they do themselves. Of course, that's my *metier*. You know the man at home who comes to the back door with a little black bag and a two day's beard, and says he's come to mend the telephone; and you say, "Oh, very well, I suppose it's all right; let him come in, but keep an eye on the spoons?" Well, that's me—out here.

I am the man who brings the telephone to the Staff. They all want it—the D.D.M.S., the A.P.M., the R.T.O.—all of them, and I have to take it to them and show them how it works.

The other day I built a telephone line out to Divisional Headquarters at—. On the terrace of the chateau was a Staff officer in full bloom—all gold and crimson in the October sunshine. I saluted smartly.

"Good morning, sir; I've brought you a telephone."

"By Jove," said the Staff officer, "splendid. That's just what we want—what? I say, you know, can we talky-talky on it?"

"Yessir."

"I say, ripping; by Jove—what?"

"Where shall I put it, sir?"

He showed me where he wanted it. I connected up the leads and rang up the corps.

The Staff officer was delighted.

"What a jolly little bell! And what's that little handle for?"

"That's to ring them up, sir."

Going up to the instrument he worked the handle round in the wrong direction until he had unscrewed it. He turned to me pathetically, with the thing held up between his thumb and forefinger.

"I say, I'm awfully sorry; have I broken it?"

I screwed the handle on again and showed him how to turn it. Half-an-hour later, when I left him, he was becoming quite proficient.

I am never technical with the Staff; they don't understand it. A week or so ago I took a 'phone into an office—the Director or Deputy-Director of something or other, at the moment I didn't notice what. He told me to put the telephone on his desk. After I had joined it up, I explained to him how to use it.

"This end," I said, "you put to your ear; the other end you speak into; and while you're speaking you must keep the spring there pressed down. And mind, you can't ring them up until you've put the receiver back here."

I also showed him how to ring the bell.

He seemed a little impatient. When I had finished he said, "Your excellent exposition in telephony has been invaluable to me. Good morning." But there was that in the tone of his voice that I did not understand, and as I went out of the office I glanced up at the little wooden notice-board above the door. On it were the letters D.A.S.

I have not told these things, sir, to any but you.

I have the honour to be, sir,

The Only Subaltern who has instructed the Director of Army Signals in the use of the telephone.

P.S.—I am still awaiting a second pip.

[The supreme Director of Army Signals and the Director of Army Signals (Home Defence), while assuming no responsibility for the accuracy of this statement, have no objection to its publication.—Ed., "T. & T. J."]

A FEW GLIMPSES OF POSTAL WORK.

BY W. W. YOUNG (Birkenhead).

(Concluded from page 21.)

LET us now take one or two complaints from the public.

A business firm writes to a postmaster. Any postmaster, but not Liverpool or Birkenhead—they are both perfect, I believe. "Dear Sir,—We posted a letter on the 1st instant in time for the night mail and it did not reach our clients until 12.15 p.m. the next day instead of 8 a.m. The result was that we lost an order for £500. As this is not the first time our firm's letters have been delayed, we should be glad of an explanation—envelope enclosed."

Now that's quite a nice letter, and the complaint is reasonable and justified. That letter is addressed to the postmaster.

Here's another letter. "Sir,—There's something radically wrong at the ——— Post Office, I posted a letter at 10 a.m. and it was not delivered until 7 p.m. and was then in a torn condition. The envelope had without doubt been tampered with. My letters have been delayed and opened before at the ——— Post Office, I think it is high time something was done to put a stop to what is nothing else but a public scandal. Ever since this Government has been in power the Post Office Service has been simply awful. If I cannot get satisfaction locally, I will write to our M.P. and have a question asked in the House." (That's not quite so nice.)

Here's a third letter. "I have a very serious complaint to make against the ——— Post Office, and I trust you will give the matter your immediate attention. On the 6th instant I sent a letter addressed to Miss Daisy Brown, Daffodill Cottage, Blue Bell Avenue, Southport, and it

has not been delivered even yet, two days ago. This has caused me a very great deal of annoyance and inconvenience, as it contained a very important communication. Its non-receipt put me in a false position and caused a misunderstanding, and I had to spend 1s. 3d. in telegrams. I should like to know whether you are prepared to pay compensation."

That would be sent to the Postmaster-General.

These are three common types of complaints, suggesting a possible defect in the machinery, but at which particular point it is not just now apparent. There are several possible explanations in each case. What I want to do is to show you briefly the cause in each case. First let me say that two main principles regulate the work of the Post Office in delivering letters. The first is to allow the public as much time as possible to post letters; and the second to deliver, within a certain time, a letter for a given destination posted before a particular hour. Now if every little wheel in the great complex organism always worked perfectly, always did its little movements without error in exactly the proper time, supervising machinery would hardly be necessary. But the number of letters posted varies, some nights thousands above the normal number are posted late, mail trains are late, human machines sometimes get tired too soon, sometimes talk at the wrong time, sometimes get out of gear, sometimes slide away of their own momentum on a side track. And so from various causes the conditions of work alter. The function of the supervising force is, therefore, to prevent hitches of all kinds; to despatch all letters to time, and to keep faith with the public.

Slack supervision inevitably results in delayed letters, but the supervision may be practically perfect and yet delays occur through mistakes on behalf of sorting officers, which are beyond prevention by supervising officers.

Let us see what happened to the business firm's letter. The date-stamp impression shows the letter was posted in time for the first delivery next day. Suppose the letter is addressed, say, "Morrison, South Wales."

On the back the impression of the Swansea date-stamp appears. We look on the circulation list and find that although a letter for "Morrison" circulates to Swansea up to 4.15, it should be sent to the South Wales T.P.O. afterwards—except on Saturdays when it goes to Gloucester, and on Sunday when it should go to Cardiff. The letter ought not, therefore, to have been sent to Swansea. The cover shows our despatching officer is at fault. The complaint from the sender goes to the despatching officer who notes his mistake, expresses regret and "does not do it again." Now what did the Swansea office do when it received the letter. The officers there knew that the "Morrison" letter should not have been sent there. They prepare a mis-sent form against each office that mis-sends letters. They did so in this case and that is sent to the despatching officer. If he gets a large number of these forms in a month, special machinery may be set in motion to sharpen him in case he should need it.

Now the second complaint (letters delayed and opened) was due to the postman mis-delivering the letter to a person of the same name in the same street. This person opened it, and as he did not wish anyone to know he had read the contents (especially the addressee) he had simply re-posted the letter in the letter box. Of course, these mis-deliveries are very annoying to some people, and postmen are encouraged to be more careful, by means of little black marks put opposite their names when they are found guilty of such mistakes.

Now about Miss Daisy Brown's letter. The young gentleman who complained to the Postmaster-General, wrote a letter to her asking her to meet him that evening at 7.30 *prompt* (I believe he underlined that word) to go to see "The Arcadians," as he had unexpectedly got a night off. He had waited an hour or two at the meeting place and spent part of the interval and some of his money in telegraphing to the lady, who had failed to turn up. She afterwards said she had not received the letter. Of course, he blamed the Post Office—until a few days afterwards when he received his letter back through the Returned Letter branch. Instead of addressing his letter to Southport—for some inscrutable reason he had put Blue Bell Terrace, Wigan, on the cover. Of course there is no Blue Bell Terrace in Wigan—though possibly there was another Miss Daisy. I ought perhaps to say that the three complaints are fictitious ones. It is very strange, but thousands of letters are daily misdirected in that way, and it isn't only young gentlemen writing to their Miss Daisy's who do such misdeeds. Business correspondence of importance from large firms is frequently misdirected to the wrong town in the same way, and even Post Office officials make similar mistakes.

The general railway system of the country is, of course, linked up with the distribution of the public's letters. In many instances trains are run specially for the conveyance of mails, but in all other cases the transmission of a letter from one part of the kingdom to another is dependent upon the existing train service, and every alteration in the time of departure or arrival of mail trains has its effect upon mail arrangements.

Direct mails for another town are made up by an office, provided that there are sufficient letters to send there daily. A small office will not have much correspondence for any one particular place. That small office therefore sends nearly all its correspondence to an adjacent large office or to a travelling Railway Post Office to be circulated. A large office will despatch by night mail to perhaps three or four hundred different offices in the North, South, East and West of the British Isles. It will also make up direct mails for the larger continental towns and for towns and travelling Railway Post Offices in India, South Africa—in fact for every part of the world.

The circulation of letters is in itself a big subject. The principles which determine a system of sorting are not necessarily geographical. For instance, sometimes Irish letters are due to be sent to Scotland, simply because there is a mail steamer service between Stranraer and Larne, by using which an advantage in time is gained. The fact that Bilston is quite near Birmingham

does not mean a letter for Bilston should always be sent to Birmingham. It would be a gain to send it to, say, Crewe at 3 p.m. because the train services fitted in with a delivery at 6.30 p.m. Therefore circulation is more a matter of railway organisation than of geography. Of course, the circulation of a letter at any given time of the day is not left to the individual sorter's judgment. Every surveyor's office has one or two specialists whose sole work is enquiring into, altering, modifying and accelerating the circulation of letters and parcels. These officers, representing their surveyor, correspond with other experts in other districts for the purpose of determining the quickest route by which a letter can reach its destination, and also that it may pass through the least number of hands. These gentlemen are very keen on Bradshaws and other railway literature. They track a train, say, through the London and North-Western time table, up to a big black line, over into the pages of the Midland Railway system book—thence they follow it out into the Great Western, and find, at the destination 200 miles away, that if it can be arranged for a postman to meet a train at 6.23 a.m., a transfer to a local line will bring about another connexion and a mail can reach the postmen's office ten minutes before they go out with their first delivery. The result of all these circulation arrangements is to be found in the circulation list at each of the despatch roads in the sorting office.

Then in addition to the circulation experts attached to the surveyor's staff, there are Postal traffic managers, representing the Secretary, who have control over and decide large questions of circulation and transit generally.

The Travelling Post Office System.—Running East and West, North and South, and conversely in England and Wales and also in Scotland and Ireland, day and night, are travelling Railway Post Offices, distributing letters and parcels. The chief of these travelling Post Offices run at night time. Whilst you and I and all sensible folk are fast asleep these busy Post Offices are dashing along through the blackness at express speed, the staff inside the sorting carriages fighting against time to get certain sorting done before their next stop. The T.P.O. leaves its starting point for a station, say, 200 miles away. On the journey it picks up and puts out mails sometimes without lessening its speed by means of an apparatus fixed alongside the line. At other times the train stops at stations and takes in a large number of mail bags which have been sent to these stations from the surrounding districts. If there were no T.P.O.'s, letters could not possibly be delivered as expeditiously as at present. One of these travelling Post Offices runs between Crewe and Liverpool about four o'clock in the morning. Mails for Liverpool from the South and South-West of England arrive at Crewe about 3 a.m. If these mails were sent direct to Liverpool unsorted, they could not reach there in time for the first delivery except in the central part of the town. So a staff of about twelve men from Liverpool meet these mails at Crewe and deal with them, making up mails for all the various districts of Liverpool, sorting them on the way to Liverpool so that when they arrive at Edge Hill about 5.30, there are mail carts or other mail trains waiting to take the mails to the whole of the outlying places.

Now I have finished my allotted time, and I haven't told you anything about parcels or Money Orders, or the daily accounts of the Post Office or the halfpenny post, or the numerous other items that belong to the subject of Postal work. I think, however, it is usual in completing an essay to refer to the literature of the subject for the benefit of those specially interested. The literature dealing with Postal work is full of information, but it is rather dry; it needs a lot of digging out; there are rule books dealing with the treatment of simple letters just as there are books dealing with a telegram or a telephone call, the only difference being that the regulations and rules framed in the interests of the letter are, I think, more elaborate and more numerous than those for its sisters, the telephone call and the telegram. Then there are special books of rules for Inland Parcels, Foreign Parcels, Express Service, Postal Orders, Inland Money Orders, Foreign Money Orders, Savings Bank, Old Age Pensions, National Insurance, and other branches of Postal work. The *Quarterly Post Office Guide* is an excellent source of information. Indeed if anyone here is seriously anxious to get a mass of useful Post Office information—the *Guide's* the thing, and it has a splendid index. The worst of it is that, like plum pudding, you can only take a little bit at a time.

CONCERT AT LEEDS.

A very successful concert was given by the Leeds Post Office Musical Union (composed entirely of Post Office servants), under the conductorship of Mr. W. R. Senior, on Friday, Oct. 29, 1915, in aid of the P.O. War Relief Fund. It is gratifying to note the attendance was very good, although the weather conditions were anything but propitious. The soloists, who were Miss Mabel Wood, Miss D. M. Holmes and Mr. J. H. Hall were excellent, and Mr. Senior must be congratulated in a large measure for the success of the concerted items, having excelled himself in the manner he handled the chorus. Every credit must also be given to Miss Lister, the accompanist.

This is the fourth concert given by the Union for war relief purposes, and it is gratifying to know that £123 11s. 1d. has been handed over to the various funds, distributed as follows:—

1st—Prince of Wales's Fund	...	...	£31	0	0
2nd—Belgian Relief Fund	...	...	£21	0	0
3rd—P.O. Relief Fund	...	...	£46	11	1
4th—P.O. Relief Fund	...	...	£25	0	0

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising { Mr. JOHN LEE.
Committee - - { Mr. J. W. WISSENDEN.
Managing Editor - - Mr. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

DECEMBER, 1915.

[No. 15.]

INDUSTRIAL RELATIONS.

A CERTAIN young gentleman, by profession (one might almost say by heredity) the manager of a cotton mill in the East Lancashire district, found himself in the middle of last winter in Aldershot, or near Aldershot, in charge of a body of men. He was a thoughtful young officer, and the question of industrial relationships had often bothered him in the past. So soon as he got away from industry and found himself controlling men in a military capacity the old doubts and questionings arose in a new form. Some of the men in his company were of the class of industrial workers whom he had "handled" with less or more success since he left the university. Here in the cold damp he found, to his amazement, that he was rather respected by the men. He saw no trace of sullenness. He saw no tendency to look for grievances. What had brought the change? He was not a military genius: in fact he knew that he was not a genius of any kind. Why was it that the class of men who previously looked upon him with suspicion had now something like affection for him? It was not merely the ritual of the new profession, the salute, the respectful address, the readiness to obey, which marked the difference. Our young friend was not likely to be thus easily deceived. There was a difference in heart. There was a strange indefinable sense of mutual trust. There was a suggestion of comradeship, of readiness to share inconveniences and dangers, which swept away the dangers and made the inconveniences matters almost for merriment. And so the young officer wrote home to his parent. That parent belonged to the hard school of economists who have regarded the knowledge of the value and utility of material goods as being the whole of the science of management. It was universal in its study of worth—except the worth of human nature. So our friend had to put his new views rather tactfully—"And if I ever get back to the mill—well, I have learned something."

Occasionally we are asked what will happen to the thousands of men who have left the Telegraph and Telephone Services for military duties when they return to the common round of civil occupation. Will they find their old avocations too dull to be borne? To that question, at the moment, there is no reply. But there is certainly ground for hope that behind the hideous conditions of warfare we shall all discover the true spirit which will make industrial life much more beautiful. There are two aspects to this spirit. If, with "Lara," we call upon those who have to act as leaders to show more insight into the feelings of subordinates, to deal not more tenderly so much as more humanly with those whom they control, to accept responsibilities in the spirit rather of comradeship than of command, we must also in fairness indicate that there is to be requisitioned a mutuality of trust, a more spontaneous recognition of the difficulties of leadership, a less rigid demarcation of duty, and a conception of democracy which would rather enlighten and spiritualise authority than dethrone it. Our East Lancashire friend was modest. He admitted with due humility that he had learned something. Would this not also apply to the men whom he led? Had they not also seen another aspect of human organisation? Could they not also write to their parents, the stern men who form one phalanx of the opposing ranks in industrial warfare, to much the same purpose? We can imagine two series of letters finding their way from Aldershot to East Lancashire and each of them breathing the same burthen—"And if we ever get back to the mill—well, we have learned something."

The authorities at London University are up betimes. Already they have adapted the course in economic history to include the economic results of the Great War. If there are any students left they will be considering this great theme in order that they may add a few marks to a total which is difficult to augment. We might all set to work to consider the same subject. We who try to conduct this JOURNAL have to consider it first and foremost in respect of the large numbers of our readers (and subscribers) who find themselves so tied to another calling that their interest in civil telegraphy and telephony has temporarily been suspended. But we bear that burden with due cheerfulness when there are signs unmistakable that the spirit of association is being developed through all the anguish and the sorrows. For it is the spirit which matters. It begins perhaps by permeating the body corporate with a new ideal of leadership, an ideal far removed from the older ideals which emphasised possession and privilege and power. But it does not end with a new ideal of leadership. The old jest has its new point. "I must follow those men: I am their leader." The spirit of mutual trust may have its first outward evidences in its effect on leadership, but it must have its origin in such a conception of organisation as will evoke in the main body a passionate desire to meet the new spirit of leadership half way.

THE RESIDUUM OF EFFORT.

TIME alone will tell whether our descendants will esteem us enviable or worthy of pity for living in these tremendous days. Will they envy our lot as contemporaries of the last of the War Lords and world-dividers, as participators in the last great clash of arms, as actors in the last and bloodiest of all the dramas of

history, of which they will only read in books or view through the clouded medium of pictures and plays? Or will they commiserate us as living through a period when (in Nietzsche's phase) all values were transvaluated, when nothing was of importance but the war, when the light of civilisation seemed to burn dim, when the arts of peace were deflected to the work of wholesale destruction, and when sacrifices of thousands of human lives were counted but as moves on a chessboard? For against the ennobling effects of war—the lives generously and valiantly laid down, the hundreds of thousands of plain men suddenly turned into shining heroes at the call of duty—must be set the base instincts of envy, misunderstanding and hatred which follow in war's train, the incorrigible and insatiable gust for lying which seems to overspread large remnants of the nations at war, and the almost entire subservience of progress and culture to the all-devouring conflict. Blood is "einzanz besonderer Saft," says Bernhardt, who is amongst that strange order of thinkers who regard war as a tonic for an ailing world. Blood is indeed an altogether peculiar juice, and from the lands with which it is drenched what a harvest of evils will be gathered and what a legacy of hatred will be left to the coming generation! The physicians of a darker age believed that copious blood-letting was salutary to the body; but mankind has lived to see this practice fall into discredit.

Amongst the many calamities of war not the least is the thrusting into the background of events of great moment by the one topic of the times. Quite rightly all our energies are devoted to the will to conquer, and whatsoever does not tend in that direction seems of secondary importance. But the significance of these events for future ages is not thereby in the least diminished. They will see them in a truer perspective. In our March issue we recorded the successful attempt of American telephone engineers to speak between the Atlantic and Pacific, a distance of 3,400 miles. Last month we referred to the wireless telephonic communication established over the 4,600 miles which separate the Atlantic seaboard from Honolulu; and we now learn that wireless conversations between Arlington and Paris have taken place. In times of peace these would rank as epoch-making achievements and would attract extraordinary attention in the Press. "To future generations," says the *New York Nation*, "it will make little difference just when wireless telephony began to give promise of realisation, but ours may well have a thrill of gratification over the fact that the conversations between Arlington and Paris have taken place just at this time. Not all thought and all energy in these awful years, history will record, were spent in devising and carrying out means of destruction and slaughter. There was a residuum of effort left for better things." The residuum of effort, as the writer happily puts it, is of immense importance to our successors, for the torch of progress must be handed on. If our part in keeping it alight is small it is because our undivided effort has been compelled to the service of removing a great offence. We have no choice. It is written "Needs must be that offences come, but woe to that man by whom the offence cometh!"

HIC ET UBIQUE.

OVER thirty of the hundred and upwards of the officers who have kindly acted as agents for the *JOURNAL* in the principal towns in the kingdom have resigned since the beginning of the War in order to join the colours. We deeply regret to hear that Mr. T. H. LAWRENCE, formerly agent at Hereford, was killed in action on Oct. 14.

MR. REUBEN H. DONELLY, publisher, of New York, requests us to state that the *New York and Brooklyn Classified Telephone Directory*, to which reference was made in the August issue of the

JOURNAL, although published with the authority and co-operation of the New York Telephone Company, is actually published and printed by the Lakeside Press (R. R. Donnelly, Sons & Company), of Chicago. It may interest our readers to know that the New York and Brooklyn directories for the year 1916 will total over 910,000 per annum.

WE have received from Reykjavik the first five numbers of *Elektron*, edited by Mr. Otto Björnsson, of the Iceland Telegraph Department, dealing with telegraphic and telephonic subjects (including wireless), and including reviews and translations of British and American articles. A notice of Mr. Whittle's article in the *JOURNAL* appears in the latest number. Mr. Björnsson also sends us the *Annual of the Civil Engineers in Iceland*, a handsomely printed publication containing articles in Icelandic, Danish, English and German on engineering, telegraphic and telephonic subjects. It is a great credit to all concerned in it.

LORD FARRER writes to the editor of the *Economist* as follows:—

I have just received a notice from the G.P.O., dated Sept. 24, 1915, showing a large increase in telephone fees.

No one doubts, of course, that there may be need for such increased charges at this moment, but it is interesting to examine—as I have done—the promises made by Government when they took over the telephone from private enterprise. The chief argument used was that the consumer would benefit enormously by a vast reduction in charges. This first large experiment in State Socialism in business in this country shows that a Government is actuated by precisely the same motives as private companies, except that its power is infinitely greater under a bureaucratic system of management, and that the consumer cannot trust the promises of a Government even as much as the promises of private corporations.

I may be answered that the railroads have equally discontinued their facilities and done away with cheap fares. This is no doubt true, but on the return of ordinary conditions competition will lead to reductions of rate, whereas the State will remain loaded with the debts of all the commercial undertakings which it takes over, and under our existing law no competition—except possibly in the advance of science—will be possible.

It seems to me that the only logical conclusion is that a State Department ought not to be protected in industrial undertakings, such as the telephone, more than private enterprise. In Sweden, where State telephones exist side by side with private telephones, the service is admirable.

It will be interesting to see what answer the State Socialist makes to this proposition.

From among the three sister Services, Post, Telegraph and Telephone, all of which have recently raised their tariffs, he selects the increases in telephone rates as being horrible examples of the effects of State Socialism worked under an oppressive bureaucratic system of management. The increase of telephone rates was proposed by the Retrenchment Committee of the House of Commons. The House of Commons, as we all know, is a body elected by the people to govern the people, and it has the power to tax any commodity in order to raise revenue for the common good. In the circumstances the bureaucrats—if by that term be meant the permanent Civil Servants—can only cry "Not guilty, my lord."

After all, the increased charges for telephone, telegraphic and postal communications add directly to the public revenue the full amount paid by the customers. Hardened tobacco smokers, for instance, would accept the tax on tobacco more calmly if they were not convinced that the increased price of that commodity was filling not only the coffers of the Chancellor of the Exchequer but also the pockets of manufacturers and middlemen.

WE have been caught napping by *Electrical Industries*. We now learn that their commendation of Post Office promptness in dealing with telephone complaints made through the Press was ironical. We confess that in our innocence we had thought prompt attention to such complaints might have called for genuine commendation by the Press instead of irony, especially as *Electrical Industries* has no reason to suppose that ordinary complaints are not also dealt with promptly. With reference to the other sentence quoted from that journal we plead guilty to a hasty reading of it, but not to deliberate distortion.

If the Reverend Billy Sunday is to be believed, they had a

telephone service in the days of ancient Israel, for this is the revised version of the story in modern Americanese :

"All the sons of Jesse, except David, went off to war; they left David at home because he was only a kid. After a while David's ma got worried. She wondered what had become of his brothers, because they hadn't telephoned to her or sent word. So she said to David, 'Dave, you go down there and see whether they are all right.'

"So David pikes off to where the war is, and the first morning he was there out comes this big Goliath, a big strapping fellow about eleven feet tall, who commenced to shout out his mouth as to what he was going to do.

"'Who's that big stiff putting up that game of talk?' asked David of his brothers.

"'Oh, he's the whole works; he's the big cheese of the Philistines. He does that little stunt every day.'

"'Say,' said David, 'you guys make me sick. Why don't some of you go and soak that guy? You let him get away with that stuff? He decided to go out and tell Goliath where to head in.

"So Saul said, 'You'd better take my armour and sword.' David put them on, but he felt like a fellow with a hand-me-down suit about four times too big for him, so he took them off and went down to the brook and picked up half a dozen stones. He put one of them in his sling and soaked Goliath in the coco between the lamps. David drew his sword and chopped off his block, and the rest of the gang beat it."

Our American friends will let us say that we have a preference—stupid, maybe—for the antiquated language of the Authorised Version.

SOME TRIALS OF THE PHONOGRAM SUPERVISOR.

BY EDITH M. MATTHEWS (*Liverpool*).

THE life of a phonogram supervisor can hardly be described as monotonous. In her calmest moments, occupying as she does the position of an "enquire within about everything," she must give the final pronouncement to doubtful operators and economical subscribers as to what must count "one" or "two" words, with the possibility always before her eyes of the Accountant-General taking a different view and sending her the case back to "regret and note for future guidance" in the course of a month or two. She must know the Postal Guide as well, or perhaps better, than she does her Bible, for she must settle which of half a dozen "Dunleary's" is the one required, and decide whether it needs the county hyphening on, or otherwise. Rule 67, and several others, would surely be found engraven on her brain if it was subjected to anatomical investigation after death.

Then her perspicacity!! An operator receives "Dublin" (by analogy of course) when the subscriber (by his own statement) has spelled "Douglas, Isle of Man," and couldn't have mentioned Dublin because he didn't know there was such a place. The supervisor in the face of these conflicting statements must place her hand unerringly on the culprit.

Spelling by analogy is a great cause of amazement to the unaccustomed subscriber. In the early days of telephony it was apt to be likewise a safety-valve for the operator's feelings. "D" for "donkey" was a very favourite allusion, and faintly suggested that the subscriber concerned was a little dull of comprehension, without exactly saying so. The rule of "proper names alone" being used for comparison, was so quickly introduced that it could only be concluded that to some "blind horse" the "nod" had been quite too enlightening. I have an authentic case on record,

however, of a lady, who, having tried in vain to understand what "D" for "David," "O" for "Olive," "V" for "Vera," and "E" for "Edith" stood for (said rather rapidly), ended by appealing to her better half in the following words, "Edward! do come and speak to this man. He's insulting me." Edward promptly responded, but being treated in turn to "D" for "David," "O" for "Olive," &c., went down like a ninepin.

But these are, so to speak, the diversions of the phonogram supervisor's lighter moments. It is when the words "express letter," "post letter," "night cable letter, deferred rate," fall upon her ears, that they ring with the sound of a knell. Let me narrate one of my own experiences that occupied fully an hour one evening. A sub-office, which shall be nameless, came through and asked to send a night cable letter to New Zealand. The lady in charge of the office was apparently dictating the message, but she seemed of recent appointment, and I think this was the first cable letter that had crossed her path. The code and preliminaries were received satisfactorily, but when we demanded the prefix, to settle the character of the message, matters came to a deadlock. Her soul soared above prefixes; she had no use for them. In vain we besought her to turn up page 899 in the Postal Guide and offered her the selection of "T.L.T.," "T.L.P.," "P.L.T.," or "P.L.P.," the only reply she vouchsafed was that she'd had to pay one and ninepence out of her own pocket a short time before, and she wasn't going to run any risk of it happening again. After listening patiently to the whole of the facts connected with the one and ninepence, she was sufficiently strengthened by our sympathy to consult page 899, keeping us waiting fifteen minutes while she did so, and finally, settled on "T.L.T." as most appropriate to the circumstances. All went merrily after this, until it came to counting the number of words and settling the charge. "T.L.T." was of course, counted and charged for as one word, and here the sender asserted himself; he wasn't going to pay for it. The combined persuasion and tact of the attendant and ourselves failed to move him, and to clinch matters he announced finally that he'd have a "T.W.T." instead (T.W.T. for the benefit of the uninitiated, is the prefix for a week-end letter, deferred rate). As it was then only Tuesday evening our difficulties appeared on the increase, but the rule book (that unshakable rock!) came to our aid. A saving clause was discovered which stated that the sender must post a week-end letter himself to London, which information we retailed with joy unspeakable. This is the humorous side of telegram work, but I should like to say one or two things in earnest, as an opportunity presents itself for giving some practical hints. One of the most serious difficulties we experience on "phonograms" is caused by the frequent disconnexions which take place whilst the messages are proceeding. Some of them, no doubt, are due to electrical faults, but there are one or two operating causes which might be avoided (I speak of course from the telegraph end, and some-one may wish to state the case from the telephone switch standpoint, which I shall be only too happy to hear). Having originally been a local operator myself, I know that it is by no means a difficult thing to plug into an "engaged" telegram spring, by mistake, when one is busy, and to do so might not be regarded as a very grave proceeding, but if the local operator could change places with her Post Office sister for a few minutes, and experience the nervous shock with a violent and unexpected generator ring produces, in the middle of a telegram, to say nothing of the intrusion of an entirely fresh subscriber, and the infinite pains and trouble necessary to regain the original one and allay his annoyance before the message can be completed, she would realise better the serious results of an apparently slight irregularity. Similarly, to hear a voice saying "Have you got them?" followed by a generator ring, or "Finished?" and the connexion cleared, before time has been allowed in either instance to reply, is easily explained by a little pre-occupation on the part of the operator concerned, a very probable frame of mind after several hours' hard work, but one productive of wide-spreading results. In telegram work we are dependent to a greater extent than any other on our local colleagues for the obtaining of our connexions, and the undisturbed use of them; and it will, I am sure, be readily seen to what a large extent their loyal co-operation smooths the path of the "phonogram supervisor."

OUR MONTHLY RECORD OF BRAVE DEEDS.

Serjeant G. W. WRIGHT, Royal Engineers, Signal Service (S.C. & T., Scarborough). Mentioned in despatches.

Lance-Corporal T. G. HALSALL, East Lanes. Signal Division, Royal Engineers (3rd class clerk, Supt.-Engineer's Office, South Lancashire). Mentioned in despatches.

Second Lieut. M. H. WILLIAMSON, Signal Service, Royal Engineers (Overseer, Telegraphs, Liverpool). Mentioned in despatches.

Lieut. Williamson was one of the first of the telegraph staff to volunteer for active service, and after a short period of training proceeded early this year to the Mediterranean where he was attached to the Engineer corps of the Australian and New Zealand forces. He took part in the landing at Anzac and Cape Helles and other Gallipoli operations. Before assisting in the greater drama of the war, Lieut. Williamson was well known as stage manager of many minstrel and concert parties, and earned a deserved reputation at Gallipoli as a "good sport."



SECOND LIEUT. M. H. WILLIAMSON.

We append some further information concerning the men who were briefly mentioned last month :—

Corporal G. A. WALKER, of Leeds, entered the service in 1900 and was appointed S.C. & T. in May, 1905.

Of the fifteen men in a dug-out at Cape Helles at the time, he alone was uninjured, and while shells were still bursting around and above, he obtained assistance in the work of rescue, rigged up temporary telegraph connexions, and apologised to Headquarters for the severance of communications.

Among those who knew G. A. Walker his actions in the episode are recognised as thoroughly typical of the man, and we are pleased indeed to honour him.

An enthusiastic sportsman, he was a regular prize-winner at the Leeds Telegraph Sports, and walking, as is consistent with a man bearing his name, was his week-end hobby. He is well known as the champion "snooker player" of the office, and no handicap was ever complete without him.

Corporal L. A. BOURLAY, of Shrewsbury, has always been an ardent soldier. He joined the Volunteers when quite young, afterwards transferring to the 24th Middlesex (P.O. Rifles) and then the Signal Section of the R.E. He saw service all through the South African Campaign, is a holder of both medals, and was several times under fire. He was called up with the Reserves on the outbreak of the war and drafted to France and the front early in October last year.

He distinguished himself by his coolness and despatching an important message under heavy shell fire, and afterwards retiring



CORPORAL G. A. WALKER.

in good order, for which he was awarded the D.C.M. and also honoured by the Czar of Russia with the decoration of the Order of St. George, 3rd Class.



CORPORAL L. A. BOURLAY.

Pte. H. J. HASTINGS, of the C.T.O., gives the following modest account of the deed which won him the D.C.M. :—

On Oct. 21, 1914, our Brigade attacked from a farm in the district to the N.E. of Ypres. I believe our objective was Langemarke. By midday we had advanced and driven the Germans back about a mile, and then dug in. The rest of the day was spent in sniping and improving cover, no night attack being made. The following day was comparatively quiet, but about four a heavy artillery fire was opened on our trenches, and an attack was expected. A volunteer was required to hold the culvert mouth on the German side of the brook and the narrow footway on its bank. I took the job on. At about dusk the attack commenced, the Germans charging down the slope to the brook and then through the hedge. A few got almost on the parapet of the trench before they were stopped. A fair number came my way and until I shot the first one I felt very funky, but, as they had to converge, approaching the culvert it was a fairly easy job to stop them, just a matter of keeping cool and quick shooting, and there was no time to feel nervous. I stopped them all between five yards to thirty. They offered a

good black target against the flickering light of blazing stacks and farms. If they were hard hit they would struggle and roll into the brook and drown. Many hopped, crawled or were carried away, but they left twenty-three behind them, dead or badly hit; fourteen were piled one on another as they rolled over the steep bank into the brook. On the first night of the attacks the 223rd Bavarian Regt. was engaged, on the second the 225th and the 96th Regt. Pioneers. The first two were mostly young men, the 96th older. I crawled out and got their shoulder straps, as these are useful to the intelligence officer.

"Twas rather hotter work on the evening of the 23rd but I had a good man behind, he kept me supplied with fresh clips of cartridges and hammered the rifle bolt open when it jammed, which it often did, and fixed the bayonet when required, I using his gun. All said and done the whole job was nothing very difficult.

LONDON TELEPHONE AND TELEGRAPH SOCIETY.

Mr. Herbert Samuel's speech at the opening meeting on Oct. 25, 1915.

I HAVE to thank the society in the first place for the honour they have done me in electing me as their President for the year, and I am glad on this occasion to have the opportunity of meeting the members. Even amid the clash of arms you are, I think, right to continue your scientific and technical discussions. Although the attention of most of us is centred day and night on the great European struggle, still the daily work of the professions of this country must continue and the efficiency of its services must be maintained during the war.

The development of the Telephone Service to which we had all been looking forward with such great anticipation has necessarily to be in abeyance; there is neither capital nor labour available to supply the equipment which is needed for its extension. But while development is stopped the opportunity can be taken to perfect organisation. I believe that since the amalgamation the efficiency of the Telephone Service of the country has gradually, but steadily, increased, and it has been called upon during the war to render useful service in many novel directions. I made it my business lately to enquire of the Admiralty unofficially, and in a personal fashion, whether they were really satisfied with the Telephone Service that was at their disposal on the occasion of the air raids, and the Admiralty replied in the most cordial terms saying that nothing could be better than the rapidity and efficiency of the Telephone Service when called upon to meet the sudden stress which falls upon it from time to time in connexion with Zeppelin raids. It was very satisfactory to know that the Department responsible for the defences of the country in that regard had no complaint to make, but were on the other hand most grateful to the Post Office for the service rendered in that connexion.

Well, I venture to think that the British Telephone Service has still some road to travel before it is in all respects as highly efficient and perfect as the Telephone Service of the United States, which has always been held up to us as a model, and which so far as I could judge during my visit to the United States two or three years ago had certainly reached a very high standard of perfection. For that the American people have to thank not only the telephone companies but also themselves. The public there has been educated to be a good medium for telephonic communication, so to speak; and I have no doubt that the telephone habit being so ingrained among the American people, and the characteristics and temperament of the American mind lending themselves so greatly to making the best use of every form of mechanical contrivance, have contributed very much indeed to the high standard of the Telephone Service of that country. Still, I am quite convinced that, although in this country we are always a little slower to develop than some other nations, the time will come when the standard of the British Telephone Service will be as high as that of any other country in the world.

The amalgamation of the two staffs has been completed. The transfer of the Telephone Company's system to the State was one of the chief features of my previous tenure of office as Postmaster-General. The amalgamation of the two staffs raised questions of

the greatest complexity and difficulty, as you are all well aware, and perhaps some of you too well aware; but these questions have been solved, and to my mind they have been solved with much less trouble and friction than might have been anticipated beforehand. This is due to the infinite trouble taken by the Secretary's office in the endeavour to mete out justice to all the various competing interests involved, and I think that the Secretariat is entitled to the greatest credit for the painstaking manner in which it attacked and conquered the difficulties that had to be faced.

The Service will perhaps be in some ways affected by the Budget changes in telephone rates, but I do not think that it will be affected to any serious extent. The flat rate has been increased, but that so far from being a disadvantage will probably be a great advantage to the Service. The trunk rates have been increased, but so far without any very serious effect on the traffic, and in all probability the trunk traffic is not likely to be very greatly affected by that change. Probably the normal growth will bring it back to its former dimensions in a very brief time. With respect to the ordinary rate for measured service I am, myself, most strongly opposed to any increases, and would resist any suggestion that might be made in one quarter or another for an increase in the charges for ordinary telephones. I hold the view very firmly that this country is much under-telephoned. The telephone development so far is merely a beginning, and it ought to be multiplied many times before we reach the right standard of development here; and so far from imposing any increase in the charges of ordinary subscribers' telephones under the measured rate, I should desire to see modifications in the other direction with a view to encouraging very largely the extended use of the telephone.

As probably most of you are aware a new scale of rates, of a character more attractive to many classes of the population, was ready when the war broke out and was under discussion with the Treasury, which would probably have resulted in its early issue. The war has postponed that, with so many other good things; but when the war is over the time will come for a general revision of the whole of the telephone rates of this country, and the result of that revision will, I am sanguine enough to think, contribute in no small degree to the extension of the use of the telephone amongst the population at large.

The increase of telegraph rates has been unfortunately inevitable in view of the losses that have continued for so many years in the Telegraph Service, but I am hopeful, there again, that the diminution of traffic will not be very large, and possibly may be remedied by later growth.

One of the chief problems for the Department in these days is how to secure the proper co-ordination of these two Services—Telegraph and Telephone—and that is a problem to which you, who are members of this society, no doubt give your constant attention.

I was greatly impressed by the close and growing inter-relationship of the Telegraph and Telephone, and a few years ago in order to encourage the proper combination of the two Services in various directions, I created a new post in the Department—that of Third Secretary—an officer whose special duty it was to be to supervise both Telegraphs and Telephones, and to secure the due assistance of the one to the other in all proper cases; and the Department was exceedingly fortunate in having among its members Colonel Ogilvie (cheers) who was the obvious choice for this new post, and whose quiet, far-seeing and active organisation of the twin Services has been of the greatest value to the Department and to the State. (Cheers.)

These are days in which the British nation is somewhat introspective. We are considering our own qualities, our own virtues and especially our own defects, and are comparing ourselves with our enemies across the sea. I think that we can say truly that the German people is not, as a whole, possessed of greater intelligence than the British people; the average Englishman is perhaps cleverer than the average German. Certainly this war has shown that the enemy nation has a far lower standard of morality and principle in very many respects than the British nation. But I think that most of us must confess that the Germans, as a people, are perhaps somewhat more hard-working than the

British as a people, particularly in the intellectual sphere, and that if Britain wants to rise to the full height of her innate greatness we must have harder work and harder thinking among the professional men, and among the leaders of thought. I am disposed to the view that our public school system is somewhat to blame for the comparative slackness of intellectual work which is frequently visible in this country. Most boys learnt in the public schools that hard work was bad form. That used to be the prevailing sentiment, and it continued very naturally into adult life. Many think that their duty is done if they do their work in the ordinary fashion, up to the average, during office hours, and that they need not trouble to think very deeply at other times, or to take great pains over it conscientiously and energetically; and then later in life they are surprised to find that, in whatever service they belong, they do not obtain promotion, and they are convinced that some underhand conspiracy exists against them, to keep down talent and prevent merit from receiving recognition. Well, I am extremely glad to think that in the Post Office there is a spirit of greater activity, a certain intellectual ferment among many of those who are connected with the directing work of the Department, and that there are a very large number who do not limit themselves merely to the routine performance of their everyday duties up to what is regarded as an average standard of efficiency, but who genuinely give their whole minds to their work, and are possessed with a spirit of striving to improve their own attainments and so to perfect the Service to which they belong.

Towards this end the admirable TELEGRAPH AND TELEPHONE JOURNAL, which has been started under the auspices of the Department, contributes effectively, and this society, established for the same object, does contribute by its discussions, by the papers that are prepared for it, to promote that movement which I have just described. It is therefore with great satisfaction that I have accepted the office of President to which you are kind enough to elect me, and I now call upon Mr. Dalzell to read the paper which we expect from him.

Mr. R. A. DALZELL then read his paper on

PROVINCIAL ORGANISATION AND DEVELOPMENT.

It is not my intention to deal exhaustively with the subjects which I have taken for my address but rather to survey briefly the general position of the Telephone Service in the English Provincial centres, especially with reference to what has been or is being done to establish an effective and efficient organisation.

The cessation of development due to the present European crisis does not form any part of my subject, as that is not a matter with which we can properly deal at the present time, but we may rest assured that when the time comes to disclose fully the part played by the Telephone Service in the conduct of the war it will be a part of which no one will be ashamed.

Prior to the transfer to the State of the National Telephone Company's undertaking much was said and written about the advantages and disadvantages of Government control of telephones, but I do not remember that the advantages of Government control at a time of war was advanced by any writer, yet we have seen what a very necessary aid to Naval and Military organisation State control has proved; but perhaps for a few minutes it would be well to consider what were the dangers anticipated when the transfer took place and how these dangers have been or are being avoided.

Statements appeared in the Press to the effect that no business man expected either the high efficiency or the wide development of the telephone service which his business required for the following reasons:—

That the Service would be subject to political control and to the uncommercial methods of a Government Department.

That even if the Service showed a profit, which was very doubtful, it would not be developed at the rate necessary to meet the business requirements of the country, because the financial control of the Service would be vested in the Treasury and not in those responsible for the conduct of the business. That Treasury control must in its nature be narrow and could not be stimulated by commercial considerations, and consequently any large development would have to be preceded by a powerful public agitation, as the Treasury, always hostile to new expenditure, would supply the necessary funds only after vexatious and injurious delays.

That the official attitude was never sympathetic to suggestions or complaints, and the Service would therefore not respond to public requirements.

That public servants had no interest in their work, their output was low and they worked under conditions promising no improvement with the rise in magnitude of the Service, and that as the establishment would be greatly increased, strong political pressure to increase wages would be brought

to bear on Parliament, thus augmenting an existing evil of considerable magnitude.

These criticisms were usually prefaced by figures representing the losses on the Telegraph Service during past years. Some critics went so far as to state that commercial men had experienced such inconvenience from the way in which their business had been hampered by the failure of the Post Office to realise their requirements in regard to telegraphic communication and the provision of an adequate telegraph service, that no confidence could be placed in the Department's control of telephones.

Material facts were omitted and little was said of the unrivalled excellence of the letter post and the extraordinarily cheap rate at which telegrams can be despatched not by the public only but especially by the Press, no mention was made of the large free delivery radius or of the fact that practically every hamlet in the country had telegraph service at its disposal, and that coastguard and other communications were provided. An attempt was made to persuade the public that the reduction of the minimum telegraph rate in 1885 to 6d. was a reduction in theory only, as the address had to be paid for if twelve words were exceeded, whereas the average charge was actually reduced from 1s. 1d. to 8d., a reduction of 38 per cent., and the number of telegrams in the year increased from 33 to 50 millions, necessitating heavy capital expenditure. Yet the public expected the Service to pay its way and to enable a cheap Press service to be given and a costly underground system to be provided to ensure a stable service, and so we were led to believe that in connexion with the Telephone Service financial disaster might be looked for on a greater scale than that experienced in the case of the telegraphs. Many of the criticisms were no doubt due to a fear that if the State were successful with telephones it would be encouraged to fresh undertakings, especially railways. While some critics considered that the public would be willing to pay a fair price for an efficient service and that agitation with regard to reduction of rates was misguided, others boldly stated that under private enterprise an efficient service at the cost of £2 per annum, including 500 calls would be established, and that such a tariff was a sound financial proposition.

The difficulty these critics had to overcome was that of explaining away the objections to separating the management of the telephone and telegraph systems which are now practically interdependent. It was recognised that the telephone was the natural and proper supplement of the telegraph. It was seen that under separate administrations there would be of necessity waste of money in duplicating the existing pole routes, underground systems, buildings and supervising force, so that the advantages of uniting the Services were fairly obvious; yet there appeared to be in some quarters a genuine feeling that, while telegraphs and telephones were technical industries requiring highly organised systems and highly skilled labour and should be under one administration, political control might be exercised to create unsound telephone tariffs and high rates of wages without regard to the cost of the service, and that however able and painstaking the officials, it was impossible for a Government Department to work the business economically.

These are, of course, the general arguments used against all kinds of Government enterprises dealing with public utilities.

On the other hand Dr. Holcombe, in his book on the Public Ownership of Telephones, uses the following arguments in arriving at the conclusion that the great merit of public ownership is that under proper industrial conditions it fulfils more economically than any other method the supply of the user with the kind and quality of service that he desires.

The community in its capacity of owner possesses a political organisation the purpose of which is to lay down the general rules for the conduct of the business and to supervise the general results of operation.

This purpose is accomplished by means of the control over rates and over the Budget.

The community in its capacity of patron for its own business undertaking, possesses an economic organisation, the purpose of which is to take part in the daily work of management and to ensure the satisfaction of individual wants. Each of these organisations serves as a check on the other.

The political organisation prevents the sacrifice of the interests of the owners, that is the community as a whole, to those of any portion of the community which may be especially concerned in its operations. The economic organisation prevents the sacrifice of the interests of the patrons to those of the owners. Both organisations act as a spur to the management, inciting it to a more economical and a more efficient conduct of affairs.

By retaining complete control in its own hands the Government has the opportunity to adopt methods for the establishment of rates and the maintenance of service that would be impossible under any form of private ownership. In a business such as the telephone the best security for the establishment of reasonable rates is to give those who are to pay the rates a voice in the making, and the best security for the accurate adjustment of the supply of the telephone facilities to the demand is to give to those who are to use the facilities a share in the responsibility for their creation. The policy of public ownership is best fitted to enable the community to avoid both the periodical over-production of free competition and the perpetual under-production of private monopoly. Under the alternative to public ownership—namely, a regulated private monopoly—there is no greater security for sound industrial progress than under public ownership, and it is certain that at least a portion of the advantages will be appropriated by the monopolist. Accurate accounts and a clear annual report of each year's operation are, however, essential so that public financial criticism may be effective.

Such then were some of the arguments used for and against State control.

When the transfer took place many changes were involved, and it was no small matter to bring about complete fusion without friction or loss of some of the good features of one or other of the existing organisations, and yet that

is being done. Little that was good is being sacrificed and when the combined organisation is complete, it will be better and more efficient than either of the systems replaced.

To ensure success, that is, efficiency with economy, we have been told that the following requirements have to be met :—

1st.—A strong centralised administration in close touch with each of the three functional branches, Engineering, Traffic and Commercial, including accounting.

2nd.—Complete harmony and co-operation between the different departments.

3rd.—Specialisation and concentration in each of the branches, especially in connexion with the economic problems involved, under direct effective control of specialists in each.

4th.—Such accounts, records and statistics as may be necessary to enable the relative efficiency of the whole machine or any functional part, or main division of the business, or the relative efficiency of any district to be seen, and any variation to be brought to light so that they may be studied, understood, and, if necessary, modification in method or staff applied.

With perhaps one exception it will be found that these requirements are being met. It must be remembered, however, that not only has provision to be made for the special requirements and organisation of the Telephone Service, but for its correlation with other Post Office Services, consequently the organisation is of necessity somewhat complex. The necessary results are, however, attained by conferences and correspondence between the several branches of the Secretary's Office and by the concentration of district supervision in the offices of Surveyors with the local control of staff in the hands of Postmasters.

The administrations of all services is centred in the Secretary's Office, and is divided amongst several branches and sections with differing responsibilities and different points of view, and in order that a central principle may govern the whole of the headquarter operations as affecting the Telephone Service, conferences have been arranged between representatives of each so that the work of the various branches and sections, each of which has an important bearing on the whole telephone system, may be correlated. In this way is obtained a central authority with one governing principle, and all requirements for the future can be seen and studied in advance.

The Accountant-General exercises general control of expenditure on behalf of the Treasury, acts as financial advisor to the Secretary, and sees that any scheme or expenditure agreed which is outside the limits laid down by the Treasury is submitted in proper form for their lordships' authority.

He also deals with the accounting.

As Colonel Ogilvie recently told us, from the accounting point of view all that is necessary is that no expenditure is omitted, all expenditure is covered by proper authority and at the same time all receipts are properly brought to account, that is to show the results in terms of money. I therefore do not intend to deal further with this branch of the work except to say that economy is as necessary in accounting as in any other branch, while specific data as to the cost of each operation and the cost of the operations of each section must be developed. What is being done in that respect may be seen by a perusal of the address read by Mr. Wylie before our society the session before last.

The Engineering staff and works are controlled by the Engineer-in-Chief and his expert staff. For this purpose the country is divided into eleven districts each under a Superintending Engineer having full control of the construction and maintenance of all engineering plant in his district, and each of these districts is sub-divided into suitable sections for executive control each under an executive engineer. These sections number 47 in all, so we have in this branch territorial divisions with functional control not confined to Telephones however but including Telegraph and other Services.

Similarly for the very necessary purpose of decentralising secretarial administration, the country is divided into fourteen districts each under the control of a Surveyor or Postmaster-Surveyor. These districts correspond with the eleven engineering districts except that in certain cases an engineering district comprises the districts of two surveyors.

Apart from Engineering, the whole of the administrative control of all the Post Office Services is focussed in the Surveyors' Offices, thus decentralising the work of the Establishment, Staff, Postal Telegraph and Telephone branches of the Secretary's Office. It is therefore evident that to ensure expert or functional control of telephones, which is absolutely necessary if success in a highly technical business of this nature is to be achieved, a further division must be made and definite functions allotted to certain officers so that each may give his undivided attention to the development of one branch of the Telephone Service, but the combined requirements of the Postal, Telegraph and Telephone Services must be met, and duplication and waste of accommodation and staff avoided, while specialisation and concentration in the Traffic and Commercial branches is retained, the work of certain executive officers in each section being confined to definite functions.

For the executive control of the Telephone Service the country is divided into 38 districts corresponding to the executive engineering sections, except that in some cases one telephone district comprises two or more engineering sections. Each district for the purposes of development, accounting and traffic is under the control of a District Manager who is the Surveyor's representative, and on his behalf controls and correlates the three functional duties entrusted to his care. His point of view is the telephone point of view, and every question is so examined and with one single aim, viz., the rapid development of the business on sound financial lines.

He has under him three expert officers, the chief clerk, contract manager and traffic superintendent, each at the head of a department, each engaged

solely in studying and controlling the Service requirements in his particular branch.

Here there is an apparent break in functional organisation, the traffic and other sections of the Secretary's Office exercising control through the Surveyor and District Manager. This might be a serious objection, and to safeguard the position, as the Surveyor could hardly be required, amongst other duties, to deal with the many and minute technical details of statistics, traffic, &c., arrangements have been made by which on such technical questions the various sections of the Secretary's Office have direct communication with the District Managers who, having been trained in telephone work, are themselves experts, and we have therefore in practice that direct expert guidance which is essential.

The Headquarters Traffic branch of the Secretary's Office exists for the purpose of study and of scientific and experimental research and for the purpose of collecting information and traffic statistics from all parts of the country, standardising methods, sifting all proposals in connexion with operating staff, or equipment, and so bringing a wider and deeper knowledge to bear on all problems, more especially in relation to costs, but at the same time the existence of local traffic branches in each district tends to prevent local requirements being sacrificed by over-centralisation, which might result in misjudging the importance of local conditions.

The Surveyors moreover are thereby freed from questions of detail which do not affect the broad administrative lines of control, discipline and organisation, and in such administration they are experts.

In all the large towns, apart from the surveying staff, the senior officer is the Postmaster, who is responsible for all Post Office Services in his district, and is under control of the Surveyor. These Postmasters, who number 549, cannot be expected to be telephone traffic experts.

They have many other duties which are being constantly extended, and must study all problems of staff and accommodation from points of view other than those of the Telephone Service. The necessity of the Surveyor's traffic staff under the District Manager is therefore apparent. The District Manager's attention and the undivided attention of the Traffic Superintendent and his staff is given to traffic problems, which include exchange accommodation, staff requirements and service; consequently, on behalf of the Surveyor, the District Manager, under the direct guidance of the traffic section, can be, and is, held responsible for the service in his district, and for the exercise of due economy.

It may be argued that this is not an ideal arrangement, as it necessitates a divided responsibility, the Postmaster being responsible for staff discipline while the District Manager is responsible for the service rendered by staff not immediately under his control, and further that by this arrangement a difficult and delicate position is created requiring a division of responsibilities almost impossible to define.

While it is a fact that in all cases the devolution of responsibility has not been appreciated, and that to ensure success it is essential that there must be complete harmony between the officers concerned, it is a satisfaction to be able to say that the harmony which is admittedly essential is being rapidly developed, and Postmasters now recognise that the necessary specialisation requires an intimate knowledge of traffic problems to ensure efficiency with economy, and that to save delay, responsibility must be placed close to the work, for in every exchange of any size questions are constantly arising which demand expert investigation, and the range of these questions is almost unlimited, and adequate treatment requires concentration, and this work could not be undertaken directly from Headquarters.

Canvassing and the collection of rentals and fees do not directly affect the other branches of the work, and I do not propose to refer to them in greater detail, but will only call your attention to the fact that in each district the work of increasing the business and thereby making the telephone system more useful to all users is under the control of a Contract Manager, specially trained in the art of canvassing, who is advertising the service on very commercial lines, seeking to find new business and extend facilities. I fancy the critics to whom I have referred hardly expected this departure from Government tradition, and yet they might have done so had they realised that canvassing for business was in operation by the Post Office prior to the transfer and has only been more fully organised and developed.

The Contract Departments under the District Managers are responsible also for forecasting the growth of business, which is a more important function than would at first sight appear, and regarding which I shall have something further to say.

One of the many advantages of the present organisation is that the District Manager and Sectional Engineer, usually stationed at the same centre, sometimes in the same building, are able constantly to meet, and by close association avoid correspondence, and are able to discuss all questions, and they are many, which affect both the engineering and traffic branches of the work. Conferences form an essential and valuable feature of the organisation, and will be still further developed, as many matters can in that way be dealt with and adjusted more expeditiously and the executive officers kept in close touch with other sections of the work.

There is no reason to think that any part of the machine will not fit smoothly into place, or that the whole will not be powerful, effective and economical, but there is one thing still lacking, and that is a sufficiently complete set of costs and statistics covering each and every branch of the work. Of this I shall speak later.

The decentralisation which is now a part of the organisation does, however, necessitate inspection, and a more careful selection of officers with special reference to their suitability for the duties they are to be called upon to perform.

It can, I think, be claimed that these considerations have not been overlooked. Before an officer is appointed to fill any position the claims of those

who are eligible are very carefully considered, and no officer is appointed until the Secretary is assured that he is fully competent to perform the duties required. As to inspection it has even been suggested that too much is being done, for apart from the general supervision of the Surveyors and their assistants, the work of the District Offices is subject to the Accountant-General's periodical audit, which brings all irregularities to light, the work of the Traffic Department is examined by the Headquarter traffic experts, and the practical results are seen and studied at the larger exchanges which are inspected in great detail, and the work of the Contract Departments is examined by the Headquarter Contract Inspectors.

In this way it is possible for the Secretary to see that no rule or precept laid down for efficient working is being neglected. Nothing is left to chance, but a jealous watchfulness is constantly exercised to ensure that all that experience has dictated or authority laid down is being effectually observed.

It is not enough that every man should be fit and trained for the performance of his duties, but it is the duty of someone to see that he does perform them efficiently.

No man is expected to be a "jack of all trades" but a master of one, and thus by devolution and functional organisation we arrive at efficiency.

With reference to supervision it will generally be found that where work is exceptionally good the results are due to individual effort and co-operation, and any arrangements by which the officers and staff can be linked together more closely are looked upon with favour. In no case is a newcomer in any department supposed to be without the guidance, help and encouragement of a supervisor or a senior officer, and indeed it is the supervising officer who gives the work the impetus required, and the supervising officer's standard and interests which give direction to the whole staff.

To maintain interest, encourage observations and enquiry, conferences are arranged from time to time, between groups of officers in the Office, Traffic and Contract Departments respectively. The centres at which these conferences are held are selected for convenience of travelling, and it is found generally advisable to limit the number attending any meeting to not more than twelve officers, so that each may have an opportunity of expressing his opinion on all questions which come before the meeting.

With reference to encouraging education I need say nothing, as you know what is done by the Post Office by way of technical allowances and the payment of fees to staff attending Technical Institutes. Much also is being done to educate the supervising staff in supervising duties and subscribers in the use of the service, and to educate I hope the Treasury in the knowledge of the requirements of the Service.

As to the staff. In no case could a large employer of labour go back to the days when individual men arranged terms of employment with individual employers.

The system of arrangement with staff collectively has been accepted and rightly accepted, and the various societies that exist to safeguard the interests of the staff should be instruments for good, but they must have clear economic facts placed before them and must be taught that efficiency comes first and that any service furnished at a loss must in the long run mean slower development, a poorer service, and lower wages and slower advancement with fewer supervising posts to be filled. It will be found that even a Government servant recognises his responsibility, and although jealous of his rights and privileges, desires to find satisfaction in his work through the knowledge that the public service which he assists to render is bringing credit to the administration, and that, I think I may say, is the aim of those engaged in developing what is hoped will be one of the best Telephone Services in the world—a Service which by utilising scientific methods will further the progress and increase the welfare of the country.

At the time of the transfer the National Company's system included a great variety of plant, and although it may generally have been in a proper condition to perform its particular service at that time, in very many cases it did not allow of extension on economical lines to meet the growth of the business, and indeed it was found that in 126 telephone exchange areas, before any development could be undertaken, the plant would have to be rearranged or reconstructed and extended, and the plant in many other telephone areas was rapidly approaching the same unfortunate position of congestion. Moreover, in some 70 exchanges of over 300 lines the equipment did not provide for even two years' growth of business, and to this had to be added a very large number of small exchanges in a similar condition. In each case the commercial and traffic branches had to study the future growth and demands of the Service so that the engineers might prepare the necessary plans and specifications, and the extent of this work may be gauged from the fact that no less than 1,150 schemes have been submitted to the Engineer-in-Chief since the transfer and prior to the declaration of war. Each scheme, for many years in advance, required a detailed study of prospective development, distribution of subscribers, calling rate for the day, and the busy hour, distribution of junction and trunk traffic, all important factors in the problem of the economic design and lay-out of plant.

This has been the duty of the District Contract and Traffic Departments, and no little responsibility attaches to such work, as it is most difficult to forecast with accuracy the public requirements for future years. Much depends upon the decisions of the central administration as regards rates and facilities, local, trunk and junction.

Any error in a forecast must necessitate some waste, and it is for that reason that every effort is made to ensure the forecasts being as accurate as possible.

The preparation of these schemes has been but one part of the work accomplished. The engineers have not been idle. Many of the works approved are complete and many more approaching completion, and yet there is a long road to travel, as in 218 exchange areas there is not at the present time a full provision of spare plant; but this congestion is not due to the hard-heartedness of the Treasury but to the scarcity of skilled labour and the

enormous extent of the operations involved, necessitating in many cases the installation of new exchange equipment in new premises. While these works have been in progress 389 new exchanges and 984 call offices have been opened, and the net increase of exchange lines, apart from lines provided for the Naval and Military Authorities, has numbered 42,529. Considering the artificial restriction on development brought about by the congestion of plant, that record is not unsatisfactory.

1,950 trunk lines have also been completed, while the programme shows 798 still to be erected.

Other important work includes the transfer of trunk lines to local exchanges. In 1912 there were 288 purely trunk exchanges. That number has been reduced to 78, and it is hoped that ere long that number will be reduced to twelve, the agreed number of main trunk centres for through working, and as it has been calculated that broadly the time value of a trunk call under a separate trunk exchange system may be taken at eleven and under the new arrangements at five units, there must be greater efficiency and economy now than formerly. It is true that financially each case stands on its merits and depends upon the cost of circuit construction and maintenance as well as upon the cost of operating, but, as each case was considered by the traffic section from a financial standpoint and no case would have gone forward unless financially sound, an all-round saving is assured. 1,436 exchanges are now in operation in Post Offices, and this number as the outstanding schemes are completed will be very considerably increased. In this connexion it may be well to note in passing that as the staff acquires knowledge of both telegraph and telephone traffic so will they be required to make both branches of the Service subjects of special study, so that in time all traffic officers may deal with problems affecting these interdependent services.

It is interesting to find that already 10,699 telephones are in use for the transmission of telegrams and that phonogram work is largely on the increase, and so as time goes on there will of necessity be an ever closer relationship between telegraphs and telephones.

It must be apparent in dealing with such a vast and intricate system that the necessity for details of costs and statistics is most urgent, that is, if those who prophesied uncommercial methods and consequent loss are to be proved false prophets.

Standing in the first place is the question of tariff, and, as you know, that question has been studied by a committee and a scheme prepared which is waiting the conclusion of war before being adopted.

But before any tariff scheme can with safety be accepted, the necessary facts and figures must be forthcoming, for not only must the system work at a fixed standard of efficiency but it must after meeting all charges yield a sufficient return on the capital expended, and this condition must exist not for the time being alone but for an indefinite period. Up to the present time with the growth of the Service a steady increase in efficiency has been seen, brought about by improvements in plant and methods, and a better article is now being sold than formerly. How far these improvements have in themselves reduced the cost per call is not yet clear, nor can a decrease in the cost per call be anticipated with certainty, as the added efficiency which includes economy of plant and space and decreased cost of operating must be placed against the natural increase in costs as the system grows and as groups of subscribers' lines increase in size with a proportionate increase in junction working. Allowance must also be made for increase in wages, for, as years pass and the standard of living rises, an increase in wages must be foreseen, and consequently a broad margin of safety must be allowed at the outset.

If through any miscalculation the tariff was found too low to enable the Service to pay its way it might even be found that the critics were right, and the Treasury would not provide for the necessary expenditure for the development of an unremunerative business which would have the effect of increasing the annual loss, nor would it be an easy matter to persuade the country that a mistake had been made and that the loss was not due to mismanagement.

The Service must therefore be made to pay its way, and its future success depends upon no error being made as to rates. An opportunity will shortly present itself, which I think it safe to say no other country has had, of instituting a complete and scientific tariff which will insure rapid development and financial success while being equitable to small and large users. But as efficiency with economy is the great problem with which we have to deal, it is necessary that the cost of each operation should be known, otherwise deciding what tariff should be imposed or even which of two or more schemes should be selected must be merely guesswork, so that at the very foundation of the work we must have accurate details.

Moreover the reaction of rate alterations on traffic and engineering problems is so profound that no change should be made without a full and careful study of the problems involved, and it is consequently essential that the engineers and traffic officers should have submitted to them all proposals, because practically every alteration made by the administration in rates or facilities will carry with it some necessary alteration in design or lay-out of plant. All factors must be given their proper place, revenue, cost of circuits and equipment, cost of maintenance and operating, and the question of transmission must be taken into account, as from the standpoint of any one of these an otherwise good scheme may be found unsound and uneconomical.

This question of statistics, however, was very fully and clearly dealt with by Colonel Ogilvie and Mr. Hare in the papers read last session before this and the Liverpool Society respectively, and requires no further comment, and with confidence may be left in the hands of the Accountant-General, the Engineer-in-Chief and the Statistical Section.

With regard to the Department's attitude to suggestions and complaints,

Telephone and Telegraph Advisory Committees, consisting of representatives of the chief public and commercial interests of the localities concerned, have been formed in 45 towns, and being thoroughly representative command respect from the public and keep the Department in close touch with commercial requirements, and ensure prompt and sympathetic treatment of suggestions and complaints. On the other hand the committees are kept in close touch with Service problems and will be taken into the full confidence of the Department, so that the country, through them, may understand the main considerations which govern the commercial side of a Telephone Service, and fully comprehend the basis of any new tariff introduced. These committees also establish a good understanding between the administration and subscribers.

Although I have said that a better article is now being sold than formerly, which is a well established fact, yet much remains to be done to improve the position, for so long as there are large exchange systems in the country where the percentage of lost calls exceeds or approaches 30, it is evident that there is great room for improvement in both efficiency and economy.

Much of the present difficulty is due to unlimited rate subscribers overloading their lines, and this a measured tariff will rectify; and as old magneto plant is replaced by modern equipment, that is where the improvement in service will be sufficiently valuable, so will the time during which circuits are engaged beyond the period of conversation be reduced and the "engaged" trouble with all its consequent waste be reduced to a minimum.

I think then that it may be claimed that the future may be faced with an assurance of success beyond the expectations of the public, but success must depend largely upon the development of statistics and costs, a matter which is at present under careful consideration, for, as Mr. Hare has pointed out, until true comparative figures are available for all branches of the work, and comparison is possible between section and section and district and district, it will be impossible to advance with confidence, secure in the knowledge that no weak spot can develop without coming under notice, and that sufficiency and efficiency are companions.

Col. A. M. OGILVIE, in the course of a discussion which followed the reading of the paper, said

that as the society's primary object was the discussion of general questions affecting the organisation and efficiency of the Telegraph and Telephone Services, it was very appropriate that Mr. Dalzell's paper should deal with the results of the efforts during the last three years to combine the organisation of the Telephone Service with the organisation of the Post Office. Before the transfer this subject had been a matter of most serious anxiety and of wide differences of opinion. Some people thought that the Telephone Service should be chopped up into small local parts and each part placed under the charge of the local postmaster. Luckily other counsels prevailed, and the Telephone Service owes a debt of gratitude to Mr. Herbert Samuel for recognising that it was a living organism and that the vitality and efficiency of each part depended upon the preservation of its corporate life. The Post Office also was an organism, and the problem was how to combine these two living organisms in one so as to ensure mutual co-operation and efficiency. Mr. Dalzell's paper showed how much had been done to secure this result, and, although the organisation might seem complicated, the result had on the whole been successful. While the general supervision from the Post Office point of view had been provided for at various grades in the Service, the necessity for a skilled and specialised control of the actual working of the Service had been recognised. When the Telegraphs were taken over each office had been incorporated into a local Post Office, and the controlling staffs had been isolated from one another, and each had been left to work out its own telegraphic salvation with little or no expert guidance. This mistake had not been repeated in dealing with the Telephone Service. The necessity for expert control at every stage had been recognised and this specialised organisation extended continuously from Headquarters to the smallest exchange.

CORRESPONDENCE.

THE LONDON TELEPHONISTS' SOCIETY.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."
Nov. 16, Tuesday.—Debate: "The Ideal Telephonist—He, She or It?"
"He" will be supported by Mr. Horace Dive (Traffic Branch, L.T.S.). "She" will be protected by Miss James (Chief Supervisor, Mayfair Exchange).
"It" will be allowed to look after itself.

The Ideal Telephonist certainly is "IT" and deserves a capital "I." With pleasure I see that the London Telephone Society, experienced as it is in all matters telephonic, recognises that the electrical (nothing else can surely be meant by "IT" in connexion with telephonic operating) needs no one to speak for it, as it is beyond all doubt absolutely "IT." I fear that Mr. Dive and Miss James have undertaken an impossible task in contending that either "HE" or "SHE" can possibly compete with

London, Nov. 9, 1915.

"A BIT OF HISTORY."

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."
MR. GUNSTON's commentary on the "Notes from a Telegraph Officer's Diary" piqued my curiosity. What really did happen in that now far-off year, when I make no doubt the electors, and the party leaders, held the firm opinion that they were at an epoch-making stage in the development

of free institutions? "Gladstone," he writes, "was no doubt engaged in a great electioneering campaign in South Lancashire." He was. The electorate was in the act of being doubled, 1,352,970 in 1867, it grew to 2,243,259 three years later. A year earlier ('67) Fenian plots disturbed England and the "Manchester martyrs" had committed the crime that led to their "martyrdom." In March, Gladstone had launched his memorable declaration regarding the Irish Church. The Queen, on the advice of Disraeli, dissolved Parliament. The elections opened in November. Gladstone, with H. R. Grenfell, contested South-West Lancashire—a new constituency. Lord Morley in his *Life*, says: "It was a magnificent campaign. But in South-West Lancashire the Church of England was strong; orange prevailed vastly over green; and Mr. Gladstone was beaten. Happily, he had in anticipation of the result and by the care of friends already been elected for Greenwich." Lancashire, ever unkind to politicians with a reputation to lose, had maintained her tradition, but despite her rejection the aggregate result of the election sealed an ascendancy that remained for a quarter of a century.

E. C. G.

Manchester, Nov. 12, 1915.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

THE criticism, above the initials "J. J. T.," of my short article on "The Transmission of Telegrams by Telephone," in your last issue, perplexes me.

I wish the writer of the "Telegraphic Memorabilia" notes would read my article again. He has entirely misunderstood the suggestion I made. My plea is for an extension of the use of telephone lines for the transmission of telegrams, but I do not contemplate the early possibility of anything like the telephoning of telegrams between London and Glasgow.

I was long employed in a large telegraph office, and I am fully conscious of the efficiency and economy of high speed telegraphy, which no sane person expects to be superseded by the telephone. There is a sufficiently large field for the development of the telephonic transmission of telegrams, without trenching on the sphere so well catered for by the high speed telegraph systems, and I am at a loss to understand how it is that "J. J. T." does not see what I mean. My writing is not obscure, and the class of lines over which the telephone transmission of telegrams is being developed is surely well known to people with traffic experience. My article might have been lengthened, for the benefit of those who are not familiar with what is going on, but I was really writing for those who are acquainted with the trend of things in the field of activity to which the heading of my article refers.

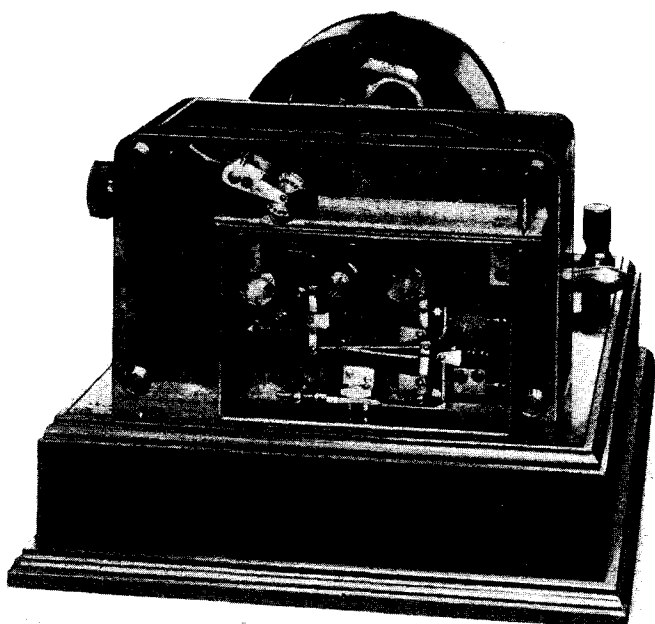
I hope I am not doing the writer an injustice, but I have the impression that the obscurity of his style purposely veils the presumption that my essay was that of a telephone man into unknown, and perhaps forbidden, territory!

R. G. D.

THE IMPORTANCE TO THE FEMALE STAFF OF BEING EARNEST: AN APPRECIATION.

BY A. GROSCH.

THE title above will suggest to playgoers not a few pleasant memories—memories which in these days it is of some value to possess. Fortunate indeed are those people who can when necessary cast back in their memories for some little incident of former days which lingers there. I cannot claim for my pen the wit and humour of poor Wilde's brilliant comedy; it is my intention to place a sterner construction upon his happy title. It is not, after all, a very far cry nowadays from the battlefield to the playhouse; and neither is it a very long step from peace to war. In fact recent events serve to show that the step is indeed a very short one. We must begin now to realise, if we have not already done so, that there is a possibility of our being engaged on a long and nerve-straining war. There are very few in the Service who cannot name at least one belonging to them who is doing duty, and as it lies within woman's sphere to stand and wait, it is necessary that she should realise to the uttermost the importance of the struggle in which we are engaged. Speaking candidly, I believe every woman in the Service has realised this, and in the Department to which I belong the realisation has taken practical form. Nothing has daunted them, and it is a pleasure to be able to congratulate them on the way in which they turned out during the recent air raid. When we remember that the call of work upon them has of late been very heavy, I think the Post Office has some reason to be proud of such workers. Every demand has been met with a spirit of cheerful acquiescence, and I think that this is a good sign indeed. Here at least is a portion of the community ready to take the rough with the smooth; and things in more ways than one have been rough. The prospect of a night's work after the day is over is no pleasant one; but the telephonists have cheerfully made the sacrifice. What is the motive force of all this? In normal



GELL HIGH SPEED TRANSMITTER FOR MORSE & CABLE WHEATSTONE WORKING.

Used by Government Administrations, Cable and Private Companies.

Also Manufacturers of High-speed Transmitters, Morse and Cable Receivers, and other Telegraphic Apparatus.

HEAD OFFICE:
Gell Telegraphic Appliances Syndicate,
Sardinia House, LTD.,
Sardinia Street,
Telephone: Holborn 6826. London, W.C.

WORKS:
Gell Telegraphic Appliances Syndicate,
Pine Grove Works, LTD.,
Tollington Park,
Telephone: North 1196. London, N.

Important New Book.

Automatic Telephony

A Comprehensive Treatise on Automatic and Semi-Automatic Systems

By ARTHUR BESSEY SMITH, E.E.
Member A.I.E.E., formerly Professor of Telephone Engineering,
Purdue University,
AND
WILSON LEE CAMPBELL, E.E.
Fellow A.I.E.E.

406 pages, 6 x 9, illustrated

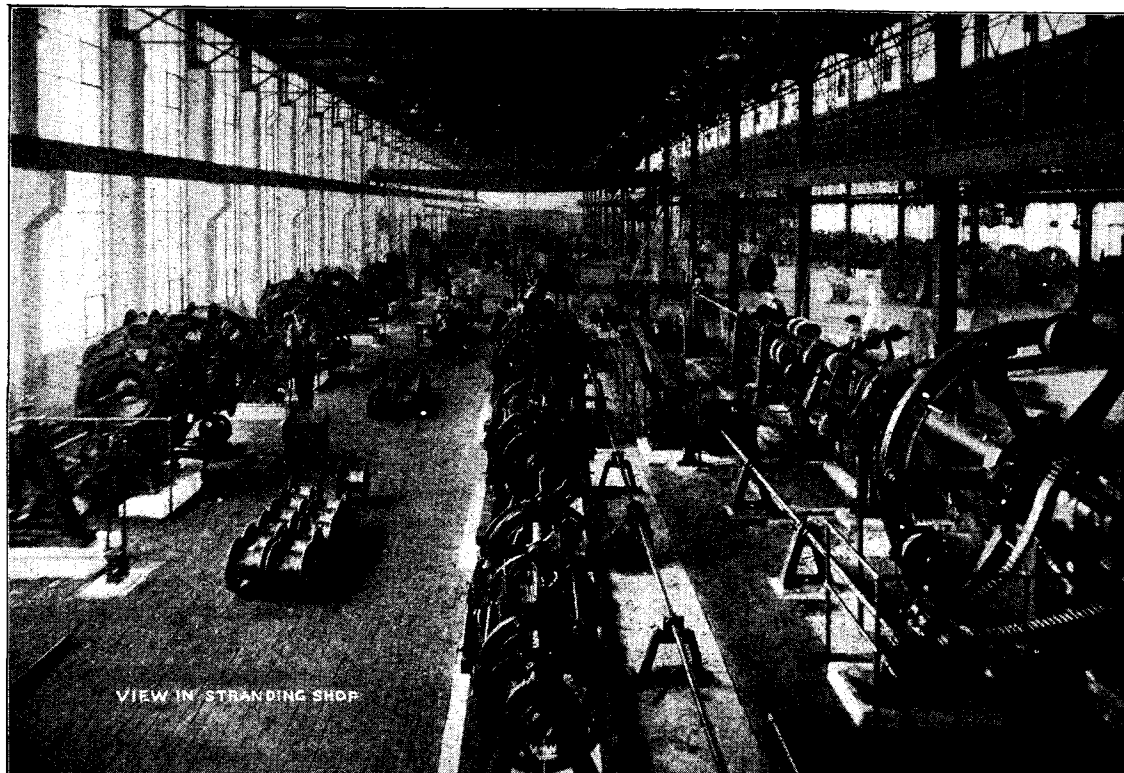
17s. net, postpaid

See our Advertisement, January issue, page IV.

CONTENTS.

CHAPTER	CHAPTER
I.—Trunking.	IX.—Automatic District Stations.
II.—Automatic Electric Company's Switchboard Apparatus.	X.—Clement Automannual System.
III.—Subscribers' Station Equipment for Use with Automatic Electric Company's Two-Wire Systems.	XI.—The System of the Western Electric Co.
IV.—Measured Service Equipment.	XII.—Long Distance, Suburban and Rural Line Equipment.
V.—Automatic System of the American Automatic Telephone Co.	XIII.—Cutovers and Interconnections of Manual and Automatic Offices.
VI.—Siemens and Halske System.	XIV.—Power Plant, Supervisory and Testing Equipment, and Circuits.
VII.—The Lorimer System.	XV.—Traffic.
VIII.—Automatic Traffic Distributor Equipment.	XVI.—Development Studies.

HILL PUBLISHING CO., LTD.,
6 & 8, BOUVERIE STREET, LONDON, E.C.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

Silk and Cotton-Covered H.C. Copper Wire.
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
13259 CENTRAL.
"ORMISTON, LONDON."

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.
HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

Adjoining Moorfields Eye Hospital. Telephone: 1309 LONDON WALL.
HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.
HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3s. 6d. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses	PER PAIR	s. d.
		3 6
Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames		7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE, WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

HAND PAINTED PORTRAITS

10/- IN OILS or WATER COLOURS. **10/-**
On Canvas and Stretcher 15 x 12 inches.

Do not keep photos of your dear ones hidden away in albums. Have their features before you in the natural colours of life. For 10/- we supply a permanent Portrait painted in oils or water colours, on canvas and stretcher, size 15 inches by 12 inches (practically life-size), ready for framing. We are making a speciality of Army Portraits at the present time. Accurate likeness guaranteed. Send photo and full details of colour of hair, eyes, complexion, and dress.

ART PHOTOGRAPHY, LTD.

(T. & T. Dept.), 47, MINORIES, LONDON, E.C.

Just Published. With 170 Illustrations, 12/6 net.

The Telephone and Telephone Exchanges

THEIR INVENTION AND DEVELOPMENT.

By J. E. KINGSBURY, M.I.E.E.

AN attempt has been made in this work so to relate the inventions and developments in the telephone field that the record may constitute in effect a short history of the telephone industry and an exposition of its main principles.

The principal inventions have been selected. The circumstances leading up to them, and the developments resulting from them, and the influences bearing on them, have been considered with all the detail that space permits. But telephone exchange service is not merely a matter of plant and invention. Technical, commercial, and political threads compose the fabric, and they are interwoven in the record. The recital of the prior causes has served in most cases to make clear the technical features.

PROSPECTUS SENT ON APPLICATION.

LONGMANS, GREEN & CO. 39, Paternoster Row LONDON. E.C.

Wales & McCulloch

ESTAB. 1853

Watchmakers to



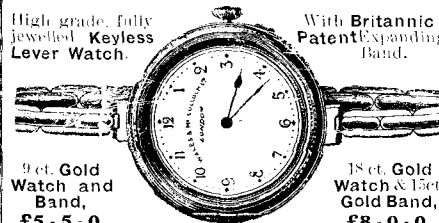
The British Admiralty

WATCH BRACELETS

For Accurate Time and Comfort in Wear.

High grade, fully jewelled, Keyless Lever Watch.

With Britannic Patent Expanding Band.



9 ct. Gold Watch and Band, £5-5-0.

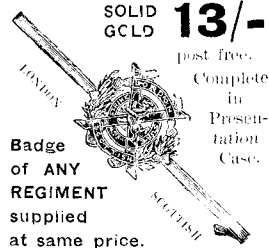
18 ct. Gold Watch & 15 ct. Gold Band, £8-0-0.

Selection from £4-0-0.

REGIMENTAL BADGE BROOCHES

SOLID GOLD 13/-

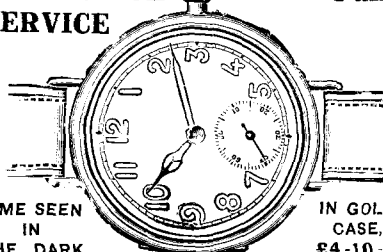
post free. Complete in Presentation Case. Badge of ANY REGIMENT supplied at same price.



FAMED WATCH WRISTLETS

FOR ACTIVE SERVICE

Fully Luminous Figures and Hands.



TIME SEEN IN THE DARK

IN GOLD CASE, £4-10-0

£2-0-0.

Solid Silver fine quality Keyless Lever Watch, fully jewelled, accurately timed, luminous figures and hands, mounted on leather strap with silver buckle.

NEW ILLUSTRATED CHRISTMAS CATALOGUE (WITH MANY SUGGESTIONS OF USEFUL GIFTS FOR FRIENDS ON ACTIVE SERVICE) POST FREE ON APPLICATION

Special Terms to all Postal Employees.

20, LUDGATE HILL, LONDON



56, CHEAPSIDE, Next Bow Church.

times girls, or men for that matter, are not so ready to give up what of the day remains after their work is done. It is a distinct encroachment upon their own sacred portion of the day; why then give it up? There is only one answer! Because they realise fully "The Importance of being Earnest." Unlike the title of the comedy, to them the words have one, and not two meanings. We were never more earnest in life than we are in our struggle to-day; and every woman who acts thoughtfully and conscientiously, works hard and earnestly, is doing her share in furthering Britain in her advance towards freedom and peace—peace and safety from the ugliest spectre that ever menaced this world.

LONDON TELEPHONE SERVICE NOTES.

THESE notes closed last month with an appeal for subscriptions to a fund organised for the purpose of sending to those members of the L.T.S. who have joined the Forces, a small gift accompanied by a message of greeting at Christmas from their comrades who remain on telephone duties. The reputation of this Service for generosity—always a high one—will be still further enhanced by the result. £150 was asked for, but a sum much in excess of that amount has been forthcoming, and all the exchanges, large and small, as well as the various branches of the Controller's office, have contributed unstintingly. Where all have done so well it is perhaps invidious to single out any for special mention, but on the other hand, it might seem unappreciative if one did not refer to the work done at "Victoria," from which exchange over £12 was forwarded to the treasurer. The exchanges in the G.P.O. South decided to forego their own Refreshment Club Christmas dinner, and the committee sent a cheque for £75 to the fund—truly a magnificent contribution. The assistance of the G.P.O. South Refreshment Club did not, however, end there, as Mrs. Twyford and her staff have lent valuable aid to the volunteer packers, and the packing has been done in the dining-room.

There has been some criticism of the articles chosen for inclusion in the parcels, but the sub-committee who dealt with this question made most exhaustive enquiries in military circles before formulating proposals, and anyone who has had experience of the Army knows how welcome at all times are literature, the means of creating literature, and the paraphernalia for removing alluvial deposits. The contents of the parcels for despatch abroad are designed to provide satisfaction physically and mentally to the recipients. Special parcels are also being sent to those in hospital, to prisoners of war, and to the nurses.

The last month has been one of excitement throughout the Post Office, and the L.T.S. has not escaped the contagion. Everywhere one has missed the "familiar faces," only to meet them a day or two later surrounded with a halo of khaki. The Traffic branch and the male exchange officers have been to the fore in furnishing recruits for the Imperial Service, but the inquisitive (one always finds some inquisitive folk in offices) are asking if any relation exists between the age of a controlling officer and the number of subordinates who can be spared.

October brought with it a series of presidential addresses at the various telephone societies. On the 25th the Postmaster-General addressed the members of the P.O. Telephone and Telegraph Society, and was followed by a paper on "Provincial Organisation," read by Mr. Dalzell. The attendance was disappointing, but those who were present had an interesting evening enlivened by a good deal of "Telegraphic Memorabilia." Amongst other things we learned that the "Telegraphic Service" was the "Cinderella" of the Services. We had long suspected from the treatment meted out to her that a Fairy Godmother was somewhere behind the scenes. The "Prince," whose affection she has gained, bears the name of the wisest of all monarchs, and the generous conditions of pay in his army are notorious.

The London Telephonists' Society met for the first time this session on Oct. 19, and was addressed by the president, Mr. Thomas Beck (now of the Royal Flying Corps) on "Some Aspects of Service." The paper covered a wide field but provoked com-

paratively little discussion amongst the gentler part of the audience. It was pleasant to find the Provincial Superintendents of the company, and Mr. D. H. Kennedy, who secured undivided consent to his plea for more skilled operating at subscribers' private branch exchanges. It is to be hoped that the debate on the ideal telephonist will provoke more discussion amongst the ladies of the L.T.S., who are of all people fitted to express opinions on such a subject.

Two meetings of the Croydon District Telephonists' Society have to be chronicled. At the first on Oct. 7 Mr. Maurice C. Pink, the president, delivered an address detailing the recent progress of telephone development, especially in the Croydon district, and also showing the relation of the Telephone Service to the conduct of war. Miss A. Ball, a telephonist, of "London Wall," followed with a paper on "Tone." The paper set out the operator's responsibility in this direction with its immediate effect on the Service, as well as the subscriber's attitude towards the Service.

At the second meeting on Nov. 5 papers were read on "Automatic Working" by the Misses Anderson and Reid, of Epsom, and on "The Art of Catering" by Miss M. B. Pyne, of Purley. Both papers were much enjoyed by the members present.

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

Transfers—

Miss G. E. MCARTHUR (Assistant Supervisor, Class II) from North Exchange to Avenue.

Miss R. HUGHES (Assistant Supervisor, Class II) from Avenue to North.

Miss FLORENCE SEEFELDT (Assistant Supervisor, Class II) from London Wall to East Exchange.

Miss OSBORNE from Western to the Trunk Exchange.

Miss S. CHAPLIN from Avenue to the Trunk Exchange.

Miss K. DOYLE from Central to Brixton Exchange. She was presented with a leather writing case.

Resignations—

Miss ETHEL FORREST (Assistant Supervisor, Class II) has resigned in view of her approaching marriage, and was presented with a dinner service by the staff of the Hop Exchange.

Miss M. V. COWARD (Assistant Supervisor, Class II), of Hop Exchange, has resigned.

Miss E. L. FIELDER (Assistant Supervisor, Class II), of Paddington Exchange, has resigned in view of her approaching marriage.

Miss M. A. PRICE, of the Central Exchange, has resigned to be married, and was presented with a clock by the staff.

Miss AGNES F. WAY, attached to the London Wall Exchange, has resigned in view of her approaching marriage.

Miss LILIAN WILKINS, of London Wall Exchange, has resigned, and was presented by her colleagues with a dinner service.

Miss G. C. ATTWOOD, of Finchley Exchange, has resigned on account of marriage.

Miss A. WRAY, of Finchley Exchange, has resigned.

Miss H. M. NORMAN, of Finchley Exchange, has resigned.

Miss M. A. BAILEY, of Hammersmith Exchange, has resigned, and was presented with a bag by the staff.

Miss S. E. CRAVEN, of Hornsey Exchange, has resigned on account of her approaching marriage, and was the recipient of several useful gifts.

Miss FRANCIS E. KENTISH, of the Trunk Exchange, has resigned to be married, and was presented by her colleagues with a silver tea service and other gifts.

Miss ETHEL B. GILBERT, of the Trunk Exchange, has resigned in view of her approaching marriage, and was presented by her colleagues with a tea service, a clock, and pictures.

Miss MAUD E. GROEN, of the Trunk Exchange, has resigned to be married.

Miss EDITH M. A. KENNY, of the Trunk Exchange, has resigned in view of her approaching marriage, and was the recipient of several useful presents.

Miss JANET R. SHARP, of the Trunk Exchange, has resigned to be married, and was the recipient of many gifts among which may be mentioned a silver tea service.

Miss A. M. SALTER, of the Trunk Exchange, has resigned.

Miss MARY C. WARD, of the Trunk Exchange, has retired.

Miss DOROTHY A. JOHNSON, of the Trunk Exchange, has retired.

Miss SHEPPARD, of Western Exchange, has resigned on account of marriage.

Miss E. L. DAVIES, of Chiswick Exchange, has resigned



Miss H. C. CROWTHER
(EAST).

Miss M. A. DAVIS
(SCHOOL).

Miss E. N. PETFORD
(TRUNKS AND PHONO-
GRAMS.)

Miss E. P. EADES
(CENTRAL).

Miss E. E. EADES
(MIDLAND).

Miss W. HIRST
(VICTORIA).

Miss M. E. HADLEY
(EDGBASTON).

A GROUP OF SUPERVISORS OF THE BIRMINGHAM EXCHANGES.

Miss L. J. BEECHEY, of the Hop Exchange, has resigned on account of approaching marriage, and was presented with a dinner service by the staff.

Miss E. M. WALLIS, of Streatham Exchange, has resigned in view of her approaching marriage, and was presented by the staff with a tea service and numerous other useful gifts.

Miss M. STRINGER, of Avenue Exchange, has resigned.

Miss A. M. WALKER, of Avenue Exchange, has resigned.

Miss H. B. SCOCH, of Avenue Exchange, has resigned in view of her approaching marriage.

Miss M. CURTIS, of Avenue, has resigned.

Miss D. MUNSON, of Avenue, has resigned.

Miss H. MASKELL, of Avenue, has resigned.

Miss A. BUCKLEY, of Avenue Exchange, has resigned in view of her approaching marriage.

Miss B. CHARLTON, of Kensington Exchange, has resigned in view of her approaching marriage, and was presented with several gifts including an ebony dressing set.

Miss M. H. MAYNARD, of Holborn Exchange, has retired.

Miss I. V. BAYLEY, of Holborn Exchange, has resigned.

Miss G. M. JOLLEY, of East Exchange, has retired.

Miss M. S. YOUNG, of Paddington, was presented with a gold signet ring on retiring.

Miss M. KENNEDY, of Bank Exchange, has resigned in view of her approaching marriage, and was the recipient of many gifts from her colleagues.

PROVINCIAL STAFF.

Mr. JAMES G. PINKERTON, Male Clerical Assistant, Belfast, on his transfer as 2nd Class Contract Officer to Dublin, was the recipient of a handsome gold albert from his colleagues.

Miss M. J. R. POSTER, Female Clerical Assistant, Aberdeen, was presented with a china tea set on resigning to be married. The presentation was made by Mr. Whitelaw, District Manager.

PORTRAIT GROUPS.

THE Editor will be pleased to receive for publication photographs similar to the above of groups of supervisors in London and Provincial exchanges, or other portrait groups of local interest.

ERRATUM.

In Mr. Cotterell's article on "The Dawn of Telephony in Birmingham," p. 24, the 21st line from the bottom of the page in the first column should read: "transmitters of the types known as Blake's. No. 3 Leclanché cells were used at first," &c.

THREE POINTS OF INTEREST TO THE MAN ABOUT TO FURNISH

<p>N^o 1 ORDINARY HIRE FIRMS CHARGE INFLATED PRICES FOR THEIR GOODS AND YOU DO NOT KNOW WHAT YOU ARE CHARGED FOR THE ACCOMMODATION.</p>	<p>N^o 2 WE SEND YOU TO RETAIL FIRMS WHO SELL FOR CASH ONLY & NEARLY ALL OF WHOM MARK THEIR GOODS IN PLAIN FIGURES.</p>	<p>N^o 3 YOU PRESENT OUR SELECTION ORDER AFTER YOU HAVE MADE YOUR SELECTION AND ASCERTAINED CASH PRICES SEE HEREUNDER.</p>
---	---	--

SPECIMEN SELECTION ORDER S.O. 326

This Introduction must be presented to the Tradesman before leaving the Establishment or should accompany the correspondence if ordering through the Post, and the Goods in every case must be charged to and appear in the Tradesman's Books as invoiced to the Association, and not to the Bearer.

Civil Service Mutual Furnishing Association, Limited,
15, CHARTERHOUSE STREET, HOLBORN CIRCUS,

LONDON, E.C., *January 1st 1914*

Messrs. *Furniture Dealers*

PLEASE ALLOW THE BEARER, Mr. *Robert*

to select Goods for us to an amount of £100 and Invoice the same to us, on the understanding the Association incurs no liability until the order is confirmed by them.

G. F. MITCHELL, Secretary.

WE CHARGE INTEREST 4½%, REPAYMENTS SPREAD OVER ONE YEAR - THE LOWEST & BEST TERMS OBTAINABLE FOR FURNITURE ON EXTENDED PAYMENTS.

TWO AND THREE YEAR TERMS CAN BE ARRANGED.



Neverstick FILING DEVICES



The Drawers are guaranteed never to bind or stick in any climate. They have Roller Bearings and can always be opened with the little finger.

Write NOW whilst you think of it

SHAW-WALKER, LTD.,

33, ST. BRIDE STREET, LONDON, E.C.

Meet the needs of all Businesses, Trades and Professions None too large and none too small. Our devices are all arranged on the Building-up System, so that you can start with sections for your requirements of to-day and add others as needs arise.

Has it ever occurred to you the amount of time that is wasted in waiting for letters or documents that have to be found when wanted, instead of being filed so that they can be had instantly?

Our "IDEAL" indexing system overcomes this waste of time.

Let us send you particulars together with our Catalogue containing 60 pages of Ideas, post free.

HAVE YOU HAD A COPY?



JUST PUBLISHED, a new Edition of the Mode Book, 48 pages of the newest and best fashions, many original ideas, in Furs, Fur Coats, Costumes, Overcoats, Macs, Blouses, Frocks, Underwear, Shoes, Trunks, etc., etc.

All supplied on our well-known 'Times' System from

5/-
MONTHLY
strictly private and confidential.

We are the only actual Manufacturing Furriers dealing direct with the profession.

Buy from the Makers.



SPECIAL TERMS
to Telephone and Post Office Staff.

Complete Sets from 35/-
Special Show of fine Black Fox.
SEND A CARD NOW FOR THE FUR BOOK.

CRICHTONS' LTD.

Manufacturing Furriers and Ladies' Tailors,
14, CRICHTON HOUSE, DEVONSHIRE SQ.
LONDON, E.C.

(One minute from Liverpool Street Station).

KNOWN AND RECOMMENDED EVERYWHERE

Do you realise that if it were not for the British Fleet you would now be searching the gutters for bread?

This is the plain, unvarnished truth. We should literally be starved out in three months but for the Navy! Yet what do YOU know about its ships? What do YOU know of the men who built it up, of its development from the wooden walls of old to its constitution to-day? You cannot appreciate the Navy as you ought unless you understand it.

THE BRITISH BATTLE FLEET

ITS INCEPTION AND GROWTH THROUGHOUT THE CENTURIES TO THE PRESENT DAY

By FRED T. JANE,

Author of "Fighting Ships," "Heresies of Sea Power," &c., &c.

WITH

Twenty-five Illustrations in Colour from Water Colour Drawings

By W. L. WYLLIE, R.A.,

and numerous Plans, Maps, and Photographs, &c.

THE ACCOMPLISHED AUTHOR.

It is the work of a man who writes out of the fulness of knowledge that comes from a lifetime study. An author who writes in such a way as to render a subject, bristling with technicalities, as clear as noonday to all.

This book is no mere catalogue of fighting ships, but the only genuine

HISTORY OF THE NAVY.

It treats of types and designers of those types, takes account of every genuine improvement in "effectiveness" from the days of the "Great Harry," commissioned by Henry VII. (the first British ship designed and used exclusively for war), down to the largest and latest of our super-dreadnoughts, "The Queen Elizabeth."

It gives an authentic account of the important new arms

THE SUBMARINE AND THE WATERPLANE.

Mr. Jane graphically describes both the uses and the limitations of these remarkable engines of war.

In short, this is probably the most vital book of the day, for it makes plain to all the great

task with which our men and our Fleet is entrusted.

SPECIAL VALUE TO MUNITION WORKERS AND INVENTORS.

New inventions were never in such demand. The Admiralty and the Munition Department have both set up influential Boards of Distinguished Men specially to examine all ideas submitted, but these ideas must be practical. Read "The British Battle Fleet" to understand what is wanted by the Navy.

YOUR SONS IN THE NAVY WILL WANT IT.

They will revel in this book if you send it to them, or keep it until they return to civil life. They know it is written by an able man well qualified to write what is undoubtedly the best account of the Navy, its present purpose and past achievements.

"THE REFEREE" says:—

"The author has 'done his bit' to turn our rule-of-thumb nation into a scientific nation by explaining how the wheels go round. . . . In these days such a book as this is priceless."

ILLUSTRATED CONSPECTUS FREE.

Containing Coloured and Black and White Prints of Famous Ships together with full details showing how the work can be purchased by all without strain upon the pocket.

Please send attached Enquiry Form or a postcard mentioning *The Post Office Telephone and Telegraph Journal*.

The Library Press, Ltd., 5 & 6 Portugal Street Buildings, Portugal Street, London, W.C.

Please send me the Illustrated Conspectus of "The British Battle Fleet." This request does not in any way imply that I will purchase the book.

Name

Address.....

The United Kingdom Postal, Telegraph, and General Civil Service Benevolent Society. (Assurance Companies' Act, 1909).

JOIN

THE NORTHAMPTON

Section A—For Ordinary Life Assurance,
" B—For GRATUITY BENEFIT,
" C—For Insurance of Wife.

MAXIMUM BENEFIT { Section A ... £150
" B ... £150
" C ... £48

The only Society in the Service, having similar objects, which uses tables drawn up by an Actuary.

Rapidly Increasing Reserves.

Economic Management.

No Shareholders' Profits to pay.

Join the Best and Soundest Society.

Contributions according to age. The younger you join the higher the benefit.

APPLY LOCAL SECRETARY, OR OF

W. T. BRAIN, CENTRAL SECRETARY, 19, Surrey Street, Strand, W.C.

CIVIL SERVICE

Share Purchase and Investment Society, Ltd.

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year.	2 Years.	3 Years.	5 Years.	7 Years.	10 Years.
17s. 4d.	9s.	6s. 2d.	4s.	3s.	2s. 4d.

Stocks and Shares bought or sold through the agency of this Society.

Full particulars may be obtained of the Secretary.

The amount advanced since the commencement of the Society exceeds the sum of £500,000.

Just Published.

Price 6s. net.

THE WIRELESS TELEGRAPHIST'S POCKET BOOK

of Notes, Formulæ, and Calculations.

356 pages. By DR. J. A. FLEMING. Roan Binding.

Revised Edition now in the Press.—Ready this month.

HANDBOOK OF TECHNICAL INSTRUCTION FOR WIRELESS TELEGRAPHISTS.

By J. C. HAWKHEAD & H. M. DOWSETT, A.M.I.E.E.

Price 3s. 6d. net.

A complete course for the Postmaster-General's Examination.

THE ELEMENTARY PRINCIPLES OF WIRELESS TELEGRAPHY.

By R. D. BANGAY.

Price 1s. net.

The above book has been specially written to meet the requirements of beginners.

THE

YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1915.

CONTENTS:

A unique collection of the Laws and Regulations relating to Wireless Telegraphy throughout the World.

A complete alphabetical List of Land and Ship Stations with their call letters.

A Glossary of Technical Terms printed in Five Languages.

Map of the Wireless Stations of the World, giving location of over 700 stations.

International Time Signal Regulations. Together with a vast amount of exclusive information upon technical subjects.

900 pages. Price 3s. 6d. net. Illustrated.

Postage: United Kingdom, 6d. extra; Abroad, 1s. 4d.

THE WIRELESS PRESS, LTD.

MARCONI HOUSE, STRAND, LONDON, W.C.

THE Telegraph and Telephone Journal.

VOL. II.

JANUARY, 1916.

No. 16.

CONTENTS.

	PAGE		PAGE
GOVERNMENT OWNERSHIP	67	HIC ET UBIQUE	77
THE HEROISM OF THE GIRL TELEPHONISTS	68	EDITORIALS—	
THE DAWN OF TELEPHONY IN BIRMINGHAM: A FEW EARLY REMINISCENCES. BY ARTHUR E. COTTERELL	69	THE STATE-OWNERSHIP OF TELEGRAPHS AND TELEPHONES ..	78
THE TRANSMISSION OF TELEGRAMS BY TELEPHONE. BY H. J. E. STILL	71	THE WAR AND TELEPHONE EXPANSION	78
A TRAFFIC DEPARTMENT IN THE NEAR EAST.—I. BY FLORENCE J. MINTER	72	THE BACILLUS OF SLOTH	79
REVIEWS	75	TELEGRAPHIC MEMORABILIA	80
		TELEGRAPHS IN INDIA. BY J. J. TYRRELL	81
		LONDON TELEPHONE SERVICE NOTES	87
		PERSONALIA	88

Subscription : To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies : To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

GOVERNMENT OWNERSHIP.

GOVERNMENT ownership of the telegraphs and telephones. What a sea of ink has been spread in this and other countries on the *pros* and *cons* of private *versus* Government ownership ! We do not now propose to enter into the controversy, but we wish to correct some obvious mis-statements which are spread abroad from time to time as regards the alleged financial failure of the Post Office administration of the Telephone Service in this country. From the December number of the *Journal of the Institution of Electrical Engineers* we learn that Mr. Carter, the chairman of the Hong Kong section, delivered an address on May 27 last, in which he made a general attack on the present finance of the British telegraphs and telephones and uttered the following libel, which we reproduce in his own words :—

Secondly I place the curious effect which service under Government has upon human nature. Within a few weeks or even days of the transfer of the National Telephone Company's undertaking to the State there arose a wide outcry at the deterioration of the service, and even those who had been foremost in urging the taking over of the service were compelled to add their voices to the general plaint. The Postmaster-General and his officers at first smiled, but when they found that the public were in earnest they pathetically asked if it were to be seriously supposed that some thousands of men and women who awoke upon the morning of Jan. 1, 1912, to find themselves civil servants should be less efficient in performing their various duties than they were the day before. I have been assured by those who knew the inner working of the Company's system that this is the only possible explanation of what occurred.

Mr. Theodore N. Vail also dealt very fully with the subject under the title of "Control and Regulation *v.* Government Ownership" in an address which is reported in *Telephony* of Chicago. After dealing with the need for control of a commercial business by experts in that business, and the difficulties of securing such control by the State under the conditions in the United States, where the responsible officials are changed whenever there is a change of Government, Mr. Vail advances the following statements as the clinching arguments against Government ownership :—

The only practically democratic Government, speaking a common language with us and having a highly specialised and fairly continuous civil service, is that of Great Britain, which took over a previously profitable telegraph service in 1870. Since then it has lost many millions of pounds in its operation with an increasing annual deficit, which for 1913 amounted

to over \$6,000,000. The telegraph rates, taking into account distance, wages and other controlling factors, are substantially the same as in this country even before the increase of 50 per cent. in the minimum rate recently made.

The National Telephone Company's exchange service was taken over in 1911. The Company had been paying the Government an annual license fee of about \$2,500,000, and paying its own security-holders approximately 6 per cent. out of its earnings.

Although the Government had a telephone organisation, which operated the toll lines and some important exchanges, although this organisation like that of the Telegraph and Post Office is permanent with permanent executive heads, although it took over the organisation of the private company, the Telephone Service earned for the year 1913-14 only \$1,500,000, but little more than one-half the license fee paid the Government. The Government operation has so far been very far from satisfactory and the public is clamouring for a service free from political and Parliamentary control.

As regards the telegraphs, we believe that this country is the only one in the world where the telegraph system has been extended to the remote country villages under a parental arrangement in which two-thirds of the loss involved is borne by the State and where such an extensive coast communication system is necessary for military, naval and life-saving purposes. The question whether the telegraph system should be made to pay its way or continued at a loss as a general aid to commerce and public safety has been discussed time after time in the House of Commons, and the last debate was printed *verbatim* in our issue of November 1915.

Both Mr. Vail and Mr. Carter are obviously well versed in the commercial methods of telephone finance ; but we think that the Parliamentary accounts of the Post Office have proved too much for them. Mr. Vail makes three errors. First, the National Telephone Company did not pay interest of 6 per cent. on their whole stock, but an average of less than 5 per cent., as the dividends varied from 3½ per cent. to 6 per cent. according to the type of stock. Secondly, the royalty paid by them in 1911 was £353,322 or, say, \$1,750,000, (not 2,500,000 dollars). Thirdly, the Post Office figures were apparently taken from the commercial accounts for 1912-13 (not 1913-14).

The following explanations are based on the 1911 figures of the National Telephone Company and the 1912-13 figures of the Post Office. The Company's dividend was less than 5 per cent. as stated above ; the Post Office paid an average interest of 3½ per cent., and made a gross profit of £303,343, representing another 1½ per cent., making 4½ in all. The Telephone Company

THE DAWN OF TELEPHONY IN BIRMINGHAM: A FEW EARLY REMINISCENCES.

BY ARTHUR E. COTTERELL.

(Concluded from page 50.)

Up to this time the business of the National Telephone Company had been conducted with some lack of uniformity. The country had been parcelled out amongst several general managers who each had charge of his separate territory and, though taking general instructions and policy from the Chairman of the Company, the late Col. Jackson, really had very free hands in matters of detail. With the development of the business it was decided by the Directors that a General Manager for the whole country should be appointed and their choice fell upon Mr. W. E. L. Gaine, who was Town Clerk of Blackburn and had established a high reputation for his abilities and business qualifications. Mr. Gaine very quickly grasped the needs of the enterprise and in a very short time from his appointment in 1892 his impress on the affairs of the concern was manifest.

At an early stage the administration throughout the country was reorganised in 1893. The officers hitherto known as general managers became provincial superintendents, and as such presided over the groups of districts allotted to them. The various districts were reorganised under district managers and local managerships set up and the duties and powers defined.

Under this scheme Mr. Coleman became Provincial Superintendent for the Midlands, and the author, who had been hitherto Local Manager became District Manager for Birmingham until 1900, when he became Assistant Provincial Superintendent, the vacated position of District Manager being filled by the late Mr. J. W. F. Ashwin, who was succeeded in turn by Mr. G. Hooper and Mr. E. Williamson.

Whilst the provincial superintendents retained wide powers, their courses of action were brought into greater unity under the direct control of the General Manager and by a system of periodic conferences held in London.

Subsequently annual conferences were instituted which were held in London and attended by all the head officers, including the district managers and other principal officials from the provinces, at which the writer had the privilege of being the first provincial officer to read a paper, the subject chosen being "Batteries for Telephonic Purposes."

In the past the various districts had their own systems of bookkeeping and accounts and as a result there was great diversity of practice.

Under Mr. Gaine's regime all this was altered and one uniform system adopted throughout the country, whilst service instructions applicable to the whole enterprise took the place of the instructions hitherto issued locally. Notable innovations took place at the Head Office of which it will suffice to mention the creation of the Engineer-in-Chief's and Solicitors' Departments. Under the Engineer-in-Chief the new works throughout the country were largely standardised.

In view of Mr. Gaine's commanding abilities his early death in 1907 was greatly regretted and felt to be a great blow to the Company, not only as regards possible achievements during the remaining years of its tenure, then rapidly drawing to a close, but because of the high hopes held as to the part which he was thought to be destined to play in the transfer arbitration.

The Government purchase of the trunk lines dated from 1894, as a result of which the Company only worked thereafter the local services.

The first practical application of superposed circuits in the Birmingham district arose in 1892 as follows. Two doctors, each renting private wires running on the same route for about three miles, complained bitterly of induction. It occurred to the author that the difficulty might be overcome at small expense by forming the two single wires into a loop for one of the doctors, and superposing an earthed circuit for the other. The general idea at that period was to use balanced resistance

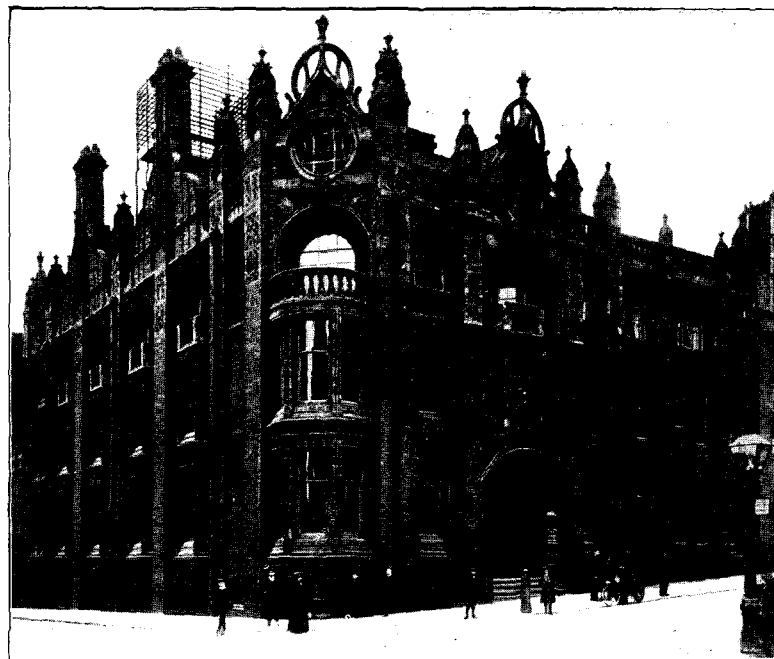


FIG. 2.—TELEPHONE BUILDINGS, NEWHALL STREET, BIRMINGHAM.

coils, but the author adopted translator coils with which he had been for some time experimenting in this way, and the result was entirely satisfactory to the subscribers. The amount of success attained led to a wider use for the purpose of providing junctions between several exchanges, where owing to serious wayleave difficulties there was a scarcity of junctions, notably in the case of Central to Aston, where the circuits were built up to their utmost capacity. In this case eight loop junctions were raised in number to fifteen. It cannot be said that this was entirely successful as it frequently happened that a fault on a circuit upset the balance of others, but as a whole it served to stave over some of the pressure until the provision of certain cable works had been completed.

In Birmingham we were from the earliest years very keen on electrophone demonstrations, the most important ones being the transmission of the performances from the theatres in London and other far distant towns to the Midland Institute at several of their annual *conversazioni*, which usually extended over four evenings. Fig. 3 is a reproduction from the *Daily Graphic*, Jan. 17, 1891, illustrating this.

Similar transmissions were effected for the late King Edward, then Prince of Wales, during a visit to Warwick Castle when he was accompanied by the then Duke of York, now His Majesty King George.

Perhaps one of the most useful and delightful instances was in 1888, when the first performance of "Coeur de Lion" by the West Bromwich Choral Society was transmitted from the Town Hall to the residence of the talented but bedridden composer, Miss Hartland, who was delighted though not a little overcome at being able to hear her work produced in magnificent style. An inter-town concert in 1892 was perhaps unique. By way of novelty for the Midland Institute the author arranged to have with the co-operation of Mr. E. W. Taylor, Mus.Doc., of Stafford, some half dozen vocalists and some instrumentalists in different towns. Each had a headgear receiver so as to keep in touch with Dr. Taylor, who conducted from his grand piano in Stafford, whilst the artistes performed in front of transmitters in towns as far apart as Dudley, Wolverhampton, Stafford and Hanley, the various circuits being bunched together at Birmingham and joined in circuit with sixteen receivers.

In the mid-nineties it was decided to erect a special building for telephone purposes in Birmingham, and thus arose the handsome block known as Telephone Buildings in Newhall Street, Fig. 2, which was opened in 1897 and equipped with a multiple switch-



FIG. 3.—ELECTROPHONE DEMONSTRATION IN BIRMINGHAM IN 1891.

[From *The Daily Graphic*, Jan. 17, 1891.]

board for 6,500 lines in the following year. It was also decided to convert the system from single wire into metallic circuit working.

With the prospective large use of dry core cables the author formulated a bolder scheme of centralisation also. This met with some opposition from the higher powers, but after persistent efforts and no doubt as a result of the undeniable figures submitted and upheld, the proposal was ultimately agreed to on a slightly reduced scale and carried into effect, thereby closing five of the sub-exchanges and greatly improving the service all round.

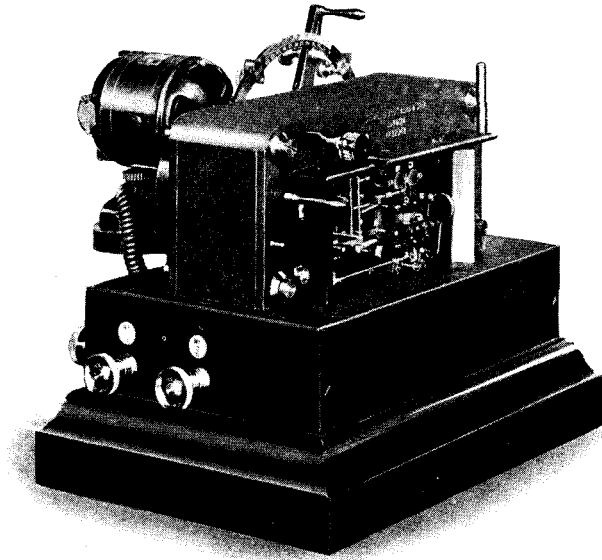
This condition lasted for several years, when owing to the growing congestion of the central switchboard, consequent on the introduction of the message rate service in 1890 and the measured

rate shortly after, the general position had to be reconsidered, and as the Company was not disposed to replace a switchboard which still had a considerable useful life before it, it was decided that some decentralisation must take place.

At the time when the centralisation scheme was prepared such developments as had been attained were not in sight, inasmuch as the message and measured rates had not been introduced. However the heavy cables used under the scheme proved immensely useful for junction and other purposes when decentralisation became the order of the day, as had been indicated in the original recommendation, should such need ever arise for this step.

In 1898 the writer was privileged to take some little part in

SIEMENS TELEGRAPH APPARATUS



Wheatstone Receiver, Direct Motor-driven.

TELEGRAPH APPARATUS for Single Current or Double Current
Working on the Simplex, Duplex, Quad-
ruplex, Multiplex, or Automatic System.

WHEATSTONE APPARATUS. Latest Post Office Pattern.
Either Weight or Motor-driven.

Apparatus for

UNIVERSAL BATTERY WORKING.

Charging, Testing, and Distributing Equipments for
SECONDARY CELL WORKING.

BAUDOT APPARATUS.

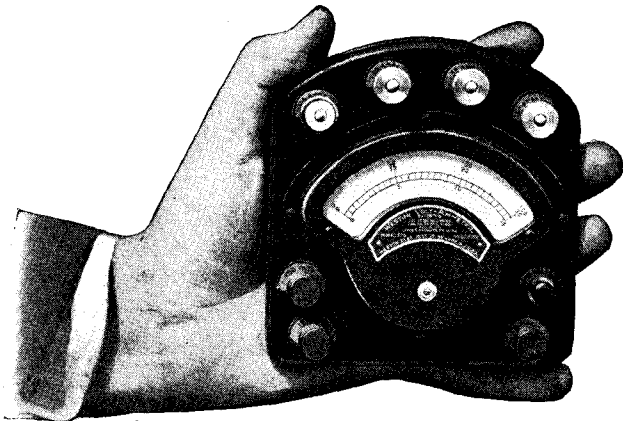
REPEATERS. Fast Speed or Key Speed.

SIEMENS BROTHERS & CO., LTD., WOOLWICH, S.E.

OVER 4,000 EMPLOYEES.

WESTON

Miniature Precision D.C. Instruments



MODEL 280 VOLT-AMMETER.

This series of Portable Miniature Instruments comprises Milli-voltmeters, Mil-ammeters, Single, Double and Triple-range Voltmeters, Ammeters and Volt-Ammeters.

DELIVERY FROM STOCK.

WRITE FOR LIST D3.

WESTON ELECTRICAL INSTRUMENT CO.

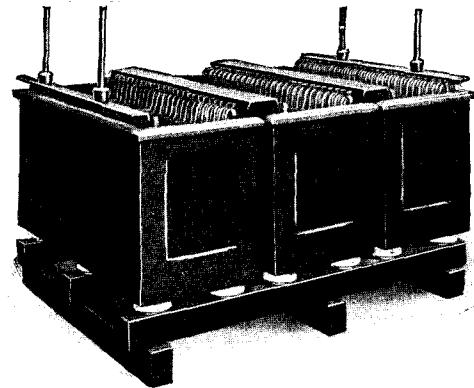
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

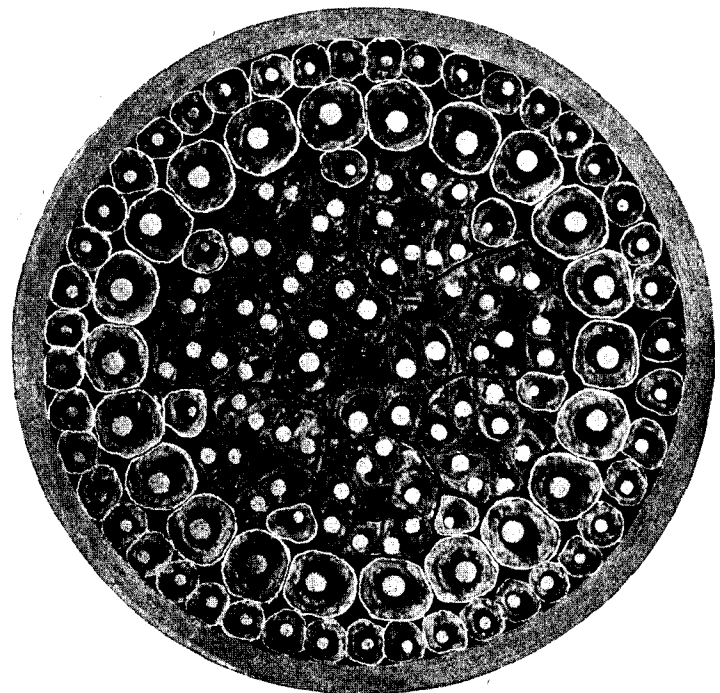
DRY CORE TELEPHONE CABLES.

*Electrical Plant of every description
for Power, Lighting, and Wireless
Installations.*

JOHNSON & PHILLIPS L^{td}

CHARLTON, LONDON, S.E.

ESTABLISHED 1875.



the experimental tests of telephony with the Continent, Birmingham being one of the centres chosen by the Post Office for such tests.

The provision of a common battery switchboard as an extension of the Central Exchange in Newhall Street, and the erection of the additional building in Hill Street, came towards the close of the writer's sojourn in his native city of Birmingham, and the story of the developments which have taken place there since his migration to London in 1908 must be left to other hands.

THE TRANSMISSION OF TELEGRAMS BY TELEPHONE.

BY H. J. E. STILL (*Acting Traffic Superintendent, St. Albans*).

THERE is always a call for new ideas, and ideas beget ideas. The man of ideas is a national asset, and the traffic officer who cultivates the faculty of imagination, and unites with it the faculty of seeing, is indeed a great acquisition to the Service.

In his "Telegraphic Memorabilia" in the October number of the TELEGRAPH AND TELEPHONE JOURNAL, "J. J. T." criticises rather strongly an article on the "Transmission of Telegrams by Telephone," which appeared above the initials "R. G. D." in the September issue of the JOURNAL. It is clear from his article that "J. J. T." assumes that the author of the remarks, against which his criticism is directed, is a telephone man, and he accordingly, no doubt with the best of intentions, resolves the matter into a discussion of the relative possibilities of the telegraph and telephone, based upon present-day practice in the case of the Baudot, and theory in the case of the telephone. I think a careful scrutiny of his article indicates that the experience of "R. G. D." in telegraph matters even exceeds his intimate acquaintance with the details of telephone traffic, and I am confident that he fully appreciates the difficulties, at present perhaps insurmountable, which lie in the way of the universal substitution of the telephone for the telegraph. I am sure it was not his intention to cast aside, at one sweep, the fast speed telegraph, and the critic has taken a very extreme view, when he considers the question as applied to the working of the T.S.-G.W. or T.S.-B.M. loops, as phonogram, or more properly, as telephone-telegram circuits.

To explain more fully what is meant, it should be realised that the main routes of our "old and tried telegraph system" must remain, and, until our dreams of the automatic transmission and reception, with record, of speech are fulfilled, nothing can compare with our magnificent long distance and fast speed telegraph systems of Murray, Creed, Western Electric and Baudot. Now the idea of "R. G. D." and I think the proposal is sound from both a telegraph and telephone standpoint, is to fuse the telegraph and telephone traffic to the utmost extent. We are at present busy cutting away all our minor telegraph circuits, and many thousands of telegrams are daily passed direct to the offices of destination, over the trunk and junction wires. The axe has, therefore, been applied to the old and substantial, though non-thriving telegraph tree, and why, if we are confident that the foundations of the telephone world will not be shaken by its fall, should we refrain from cutting still deeper into the "dead" wood? Many of our provincial towns have a dozen or more telephone loops, and direct sounder circuits, in addition to their transmitting centres. At present the trunk lines are generally insufficient to carry both the telegraph and telephone traffic throughout the day, but there is often no reason why all the telegrams should not be telephoned during other than the busy hours of the day. Assuming that the trunks between any two centres are sufficient to carry easily and without delay the telephone traffic during the busy hours, it should, in normal circumstances, and at other than the busiest centres, be practicable to deal with all commercial telegrams by telephone during the remainder of the day and night. (I am of course excluding places where automatic and fast speed telegraph apparatus are installed.) When telephonic development is still farther advanced, I think it must be agreed that this course will be practicable in all cases,

and could be followed without prejudice to either the telephone or telegraph traffic.

Now, without interfering with the main telegraph routes, by which I mean such lines as TS-BM, TS-MR., Irish and Scotch wires, &c., we must provide for the disposal of the telegraph traffic on all these other routes, during the busy hours of the day, and, in addition, of Press and special work. Can we telephone the last-mentioned traffic? Under existing conditions the reply is undoubtedly in the negative, and to provide a sufficient number of additional trunk lines would be most expensive, and would, consequently, be out of the question. We can super-superpose telephone circuits, but as a permanent arrangement this is at present most undesirable on trunk lines. In the case of a single line telegraph circuit we can instal quadruplex, and thus secure four points. The flexibility of a single line telegraph circuit is, therefore, considerably greater than that of a telephone loop, and circuit for circuit the available output of a telegraph line is much greater than that of a telephone loop, even if we apply to the latter circuit the suggestion of "R. G. D." involving the case of stenographers, typists, &c. How are we to overcome this in favour of the telephone? I think the answer will be furnished by the engineers when they can introduce an infallible method of superposing—one which will be unaffected by atmospheric changes, and which can be applied to circuits irrespective of their lengths. (The article on "Phantom Circuits" by Mr. John Gaiter in the October issue, gives some valuable evidence on this subject.) We shall then reduce the telegraph operating staff to a minimum, as the telegraph points need be staffed by trained telegraphists during only a small portion of the day, the telephone being used at all other times.

As an alternative, suppose one metallic circuit in excess of the actual telephonic requirements between any two stations be installed, this circuit to be convertible to telegraph working as and when required. This could be done simply by means of a switch. Hundred of telegraph lines throughout Great Britain carry an average daily traffic of approximately 100 to 200 telegrams. In the majority of these cases the bulk of the traffic could be telephoned provided that the engineers could introduce what might almost be termed an adaptation of the Military D. Mark III or Steven's combined telegraph and telephone instrument.

Utilise our trunk and junction wires to the utmost capacity by perfecting the superposing arrangements, and give us a means of introducing a sounder-instrument, duplex, quadruplex or Wheatstone—to become operative without interference with the telephone traffic, and a great improvement will be wrought in the intercommunication of the country. Staffing arrangements will be simplified and economised, and the telegraphists, many of whom would only be required during the morning, could be merged during the remainder of the day into one or another clerical department. The advantages to the Department, and to the staff, would be great, and they are obvious.

The net result of these changes would probably be as follows:—

(1) An improvement and development in the inter-town telephone service.

(2) The throwing out of use, and consequently out of maintenance, of all except the main and long distance telegraph lines.

(3) Reductions of skilled operating work to a great extent, and the advantages and economy accruing from an organisation point of view.

(4) Utilisation of the telephone trunk lines to their utmost extent, and consequent increase in the revenue-earning capacity of the lines.

(5) Extension of outlets from any particular office. At present the tendency is to discharge all traffic, except that between certain neighbouring towns, to the transmitting centre. The fusion of the lines would enable the results of an analysis of the telegraph office to be utilised, and other suitable outlets easily opened up.

I think everyone will agree that the substitution of telephones for sounders at the smaller offices has been most efficacious, and why, therefore, should not a similar, but slightly modified arrange-

ment prove to be satisfactory at the larger offices? Any disadvantages of the proposal could doubtless be overcome, and who knows but that a further extension of the scheme might not ultimately be possible. "How revolutionary!" cries the man from T.S., and maybe he interpolates a humorously deprecatory remark, but the Telegraph Service is most conservative, and the monotony of manipulative work tends to retard progressive thought. The thoughtful and unbiassed telegraphist may, in conjunction with the pro-telephone man, well exclaim with Sterne, "I pity the man who can travel from Dan to Beersheba and cry 'Tis all barren.'" See first, but see well and truly, and let neither Service use a microscopic lens here, and ordinary window glass there.

[Mr. Still is certainly stimulating, but there is another aspect to the question, which other contributors, no doubt, will reveal.—
ED., "T. & T. J."]

A TRAFFIC DEPARTMENT IN THE NEAR EAST.

BY FLORENCE J. MINTER (*Superintendent of Traffic, Constantinople Telephone Company*).

PART I.

To those who were disappointed that in my recent lecture on "Constantinople; its People, and its Telephones" I spoke only of the lighter side of the last subject and gave very few details of the Constantinople telephone system, I promised that in the paper for the JOURNAL, to which I had pledged myself, I would deal with the technical side and give as far as possible in the space allowed, some description of the exchanges and the work of the traffic department.

Time was when "traffic" was scarcely considered from any important point of view, and was thought of vaguely as "something to do with the operating staff."

I well remember the birth of the first Traffic Department in the National Telephone Company, and have since watched with interest the growth of departments all over the kingdom. These departments were innovations to a system which had been working since the early "eighties" and were evolved, as a natural process from the service as it grew and developed, and the need arose for scientific study of a subject which was proving so important.

Given a perfect inside and outside plant with the best men at the helm of the Engineering Department, I think all telephone people would now agree that their work would be nowhere without an efficient and well-organised traffic staff to form the human element for the smooth working of the machine.

In Constantinople we had to deal not with a slowly growing system from a mere handful of subscribers and one or two small exchanges, but to arrange for an efficient service between sixteen exchanges, two of which were equipped for 3,060 and 2,400 lines, respectively, with a complete junction system; and for 3,968 stations for which we held signed agreements. I believe I am correct in saying that we thus had to attempt something which had never before been attempted in the whole history of telephones in providing a service in an unknown land with unknown possibilities among an unknown people, who are still looked upon by the majority of folk as half barbaric, and with a chiefly native staff whose abilities and characteristics were certainly unknown quantities.

Everybody will remember that a special "study staff" spent three months in Constantinople in the year 1911, and the general lay-out and equipment eventually decided upon, was due to their reports made to Messrs. Gill and Cook, who are consulting engineers to the Constantinople Company.

Fig. 1 will show the position of the exchanges in the imperial city and its environs. The straight lines give some idea of the junction routes, and of the position of the submarine cable connecting Europe and Asia telephonically, in the narrowest part of the Bosphorus, where telegraph cables are also laid. Although I, personally, could never understand why the largest exchange should be placed at Stamboul (the Turkish quarter) instead of

Pera, which is the business centre and with more enterprising tradesmen, there are still some who maintain that Stamboul will yet justify its larger equipment. Pera is, however, quite full and with subscribers waiting to be joined up. An 800-line extension was in process of construction by the Western Electric Company when the war began and prevented it reaching us.

The annexed tabulation of the original equipment of the switchboards may be of interest. Stamboul, Kadiköy and Prinkipo are the junction centres, Bebek also serving as a minor junction centre for Bosphorus exchanges north of this village.

Regarding tariffs, almost the ideal in measured rates has been reached in this respect, and this beyond everyone's expectation; and the order had been given, just before the outbreak of the war for a big replacement of white (measured rate) opals for red (flat rate) which had been needlessly supplied. Of the 4,297 lines

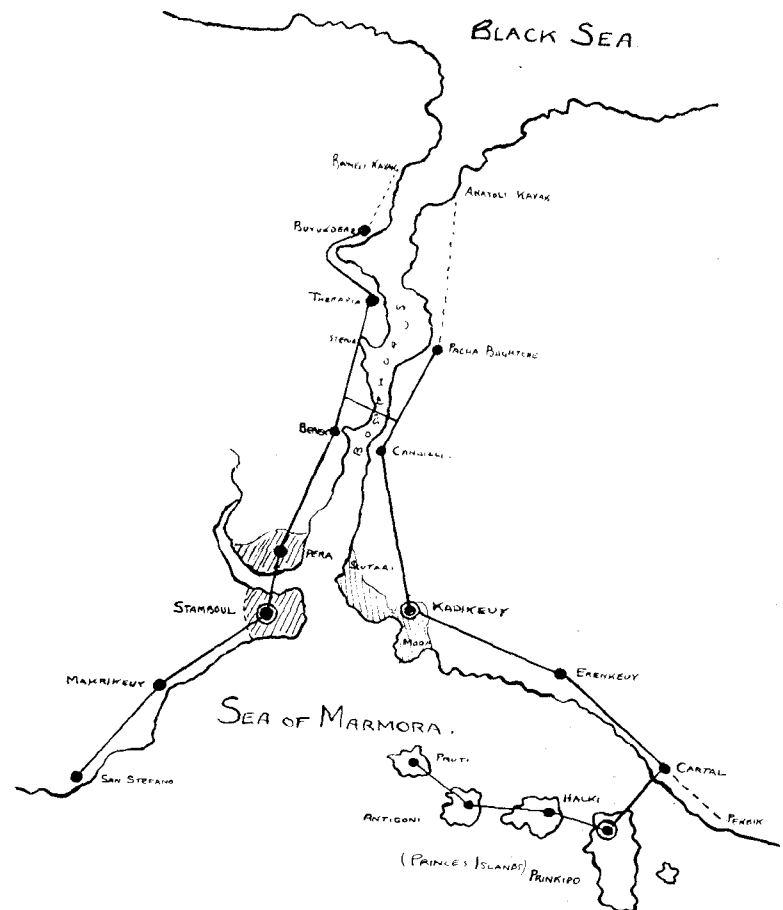


FIG. 1.—MAP SHOWING POSITION OF EXCHANGES.

joined up and working to the end of February 1915, just before we left Constantinople, the actual percentage of flat rate subscribers was, for the whole system, 7 per cent., and for Kadiköy Exchange actually under 1 per cent.

The Company's different subscriptions numbered four, all payable if desired, half-yearly in advance.

(1) *Measured Rate for Shops, Commercial and Industrial Establishments.*

Annual subscription a minimum of Ltq. (Turkish pounds) 5.50 with the right to 550 conversations, with a decreasing scale for additional conversations from Ltq.6 for 600 to Ltq.15.50 for 2,000 conversations.

(2) *Private Branch Exchanges of two or more Lines.*

For every direct line to the exchange Ltq.4 per annum. For each station with its corresponding internal line Ltq.1 per annum according to the number of stations to be installed.

TABLE SHOWING EQUIPMENT OF SWITCHBOARDS.

Exchange.	Lines Equipped.	Junctions.		B.W.	" A " Position.	" B " Position.	Combined A and B Positions.	Testing Positions.	Class of Switchboard.	
		Incoming.	Outgoing.						W.E. No. 1	C.B.
Stamboul	3,060	145	160	—	19	6	—	1		
Pera	2,400	115	128	12	15	5	—	1		
Kadikeuy	600	27	60	19	3	2	—	Combined		
San Stefano	180	7	10	4	1	—	1	—		
Makrikeuy	160	8	10	4	1	—	1	—		
Bebek	160	7	9	8	1	—	1	—		
Therapia	100	—	—	10	1	—	1	—		
Buyukdere	80	—	—	10	—	—	1	—		
Pacha Bagtche	80	—	—	9	—	—	1	—		
Candilli	120	5	7	4	1	—	1	—		
Erenkeuy	380	12	18	2	2	1	—	—		
Cartal	80	—	—	11	—	—	1	—		
Prinkipo	420	9	15	28	3	1	—	Combined		
Halki	80	—	—	8	—	—	1	—		
*Antigoni	40	—	—	4	—	—	1	—		
*Proti	30	—	—	3	—	—	1	—		

* These are not being proceeded with at present owing to insufficient orders, but the few lines signed for will work *pro tem.* on Halki Exchange.

For the calls, a minimum of 3,000 calls per annum at Ltq.12 per annum. Calls beyond 3,000 to 4,000 at the rate of 35 piastres per 100; 4,000 to 5,000, 30 piastres per 100, and beyond 5,000, 25 piastres per 100.

For private houses and flats, Government and municipal service, where there is no private branch exchange and they are connected by direct lines, subscribers have a choice of two subscriptions, *i.e.* :

(3) Measured Rate.

Ltq.5 per annum including 500 calls. Beyond 500 calls a decreasing scale from Ltq.5.90 for 600, to Ltq.11.50 for 1,500, and beyond at 50 piastres per 100.

(4) Flat Rate.

Ltq.8 per annum for unlimited calls within each zone or area (A). The European side of the Bosphorus and Marmora, and (B) the Asiatic side including the four Princes Islands.

For calls from one area to the other a junction fee of 1 piastre per call. In considering these rates the lira or Turkish pound should be reckoned at 18s. and the piastre as 2d.

The fee for call office calls is 2 piastres, or 4d. The total number of call offices working at the end of February 1915 was 72.

Never was a company so hampered and hindered by *force majeure*. Three wars—(1) the Italian-Turkish, (2) and (3) the Balkans War from 1912 to 1913—seriously impeded progress in every way. The present European War effectually put a stop to construction and operations by the British staff in March 1915. Declared contraband in the Balkan War, material never ceased to be delayed or conspicuous by its non-arrival up to the time when we were forced to leave. Of course, from August 1914 to March 1915, nothing could be obtained from England, and the engineers were put to every kind of artifice to keep things going and lines joined up. The No. 9 boards for the small exchanges were beginning to arrive, but not one was complete—some cases may even now be at the Customs House in Stamboul if the Hungarians or the Turks, who assumed charge of affairs, have not secured them and made some attempt at their construction.

Just why there were delays in delivery in peace time I cannot enter into, but I think the suppliers never realised that goods coming by sea took from one month to six weeks to reach us, and the same fact was a serious handicap where any small miscalculation in quantities estimated cannot be rectified, or special requirements met by a telegram to the factory followed by "express delivery" as at home. It is, however, with traffic matters that I now wish to deal.

When I arrived in Constantinople in May 1913 the exchange buildings were then only in process of construction, and we could not move into the offices at Stamboul until the November following, nor could the opening of the exchanges take place until February 1914.

I did not attempt to plan the organisation of traffic staff until I had given myself time to know something of the many nationalities in Constantinople likely to form both staff and subscribers. Early enquiries from people who one would have thought were able to judge resulted in such pessimistic replies of what I might expect from both, that, after a brief period of quite natural depression, I determined to ignore all the information they had given me and to start on my own voyage of discovery, bringing with me my English ideas rather than to try to fuse local social conditions and fancied requirements into the actual needs of a good telephone service. As the telephone was a new thing for Constantinople, so should be the rules and regulations for its working. When applicants for positions or the actual staff engaged would tell me, "We never do this in Constantinople," or "Have never done that," I used to reply "Of course, but then you have never before had telephones in Constantinople," and this appeared an irrefutable argument. That such a course was more than justified subsequent events proved.

I therefore first completed a book of rules and regulations, in which were also included lists of standard expressions, colours of multiple pegs, the methods of repeating numbers in French and Turkish.

This done, came next lectures and test papers for the Operating School, framed and arranged much on the basis of the "National" Company's, to cover a four weeks' course. Both of these had to be translated into French.

Four girls, natives of Constantinople (but not "Moslem" as the *Daily News* incorrectly stated some months ago), had arrived in London in September 1912 and were being trained, by courtesy of the Postmaster-General, in some of the Post Office London exchanges with a view to their becoming chief supervisors in Constantinople. One of these was an Armenian, one a Spanish Jewess (both Ottoman subjects) and two were born of English parents in Constantinople, and as such were British subjects.

I quickly realised the impossibility of running the exchanges with their help alone, and Mr. Douglas Watson, the General Manager, quickly agreed to my proposal to engage a further six girls for a shorter period of tuition, to act as ordinary supervisors and monitors. I obtained the services of a Maltese, three Armenians and two

Jewesses, and with one man transferred to me from the Contract Department, these went to London in September 1913 for a three months' course. It is through no fault of my late colleagues who gave every assistance in their power in his training, but owing to the lack of good material to select from at the time, that this man has been somewhat of a failure in the capacity of exchange manager, and a second man, trained locally, has by far outstripped him in knowledge and general grasp of the duties required.

Bearing in mind the woeful tales told of the class of girl I might expect as operators—how they would not settle to work—would do this, and not do that, and finally resign, probably without notice, I felt bound to engage a much larger staff than I knew would be required under normal working conditions, but at the same time made every endeavour to engage the apparent "cream" of those applying and to obtain girls of nice class and common sense. To everyone's astonishment—including my own after all I had been told—the applications were many, and consequently, the rejections were many also.

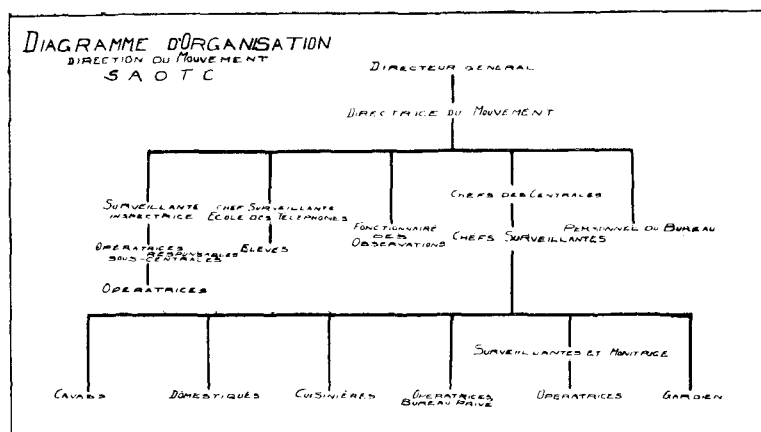


FIG. 2.—DIAGRAM OF STAFF ORGANISATION.

It had been thought possible to work the exchanges under female chief supervisors only, but the necessity of men to satisfy subscribers—since they are so unused to, and suspicious of women in business in that country—was soon apparent to me, but the services of the right men were not so easily procurable. The one man—subsequently placed in charge of Pera, was transferred as I have said, from the contract staff—the second was found after many efforts. One applicant was a Greek—a huge fellow—tall and stout, in the service of the Anatolian Railway as a station-master, who, after assuring me of his wonderful mathematical abilities—to say nothing of his knowledge of English—at one whole afternoon perspiring profusely, struggling with an arithmetic paper which any 6th standard English boy could have done in half an hour.

I had also decided that I must have a man for observation officer, and, knowing by this time the absolute impossibility of any native concentrating himself for many hours at a stretch on a duty in any way monotonous, felt that until the system had grown somewhat, this duty could be combined with that of outdoor service inspection, although as a permanent arrangement, this is a course not to be advocated.

Many men had been tried on this work—all of them lacking—and I had almost decided to promote a woman supervisor to the position, when, with the war commencing and the fearful dread of anything approaching espionage, it was decided wiser not to risk suspicion and therefore to discontinue observations.

The strange thing is, that I have since heard that the observation desk is in use, and as there is no one there who really can appreciate the purpose of service observations, or make use of them (since the English chief supervisors are not allowed to remain in the service during the war), there is to me a very obvious reason why lines are being listened on at the present time.

It is a fact that during the last ten days we were in Constanti-

nople, after being sent away from the offices, we were told of a most remarkable drop in the calling rate, and the reason given by the subscribers themselves was this: "When the English were in charge we knew we were safe—our conversations were private. We do not trust the people now in charge, they will listen to us and make use of what they hear!"

The organisation of the Traffic Department I had then arranged as in Fig. 2. I think the French classifications will explain themselves. It will be noted that a travelling supervisor had been appointed for the small exchanges. Having trained more than sufficient staff for the ordinary exchanges, Miss Binns, who had made an excellent chief supervisor of the Operating School, had, with the temporary closing of the school, taken on these duties for the time being, and would no doubt have been able owing to the peculiar conditions admirably to combine the duties of the two positions.

(To be continued.)

CORRESPONDENCE.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

I HAVE complied with the simple request of R. G. D. no less than half a dozen times, and have therefore well perused his article on page 233, Vol. I, of the "P.O. T. & T. J.," but when he suggests the use of "a few trunk or junction circuits," I can only presume that the writer meant what he wrote. In his letter he pleads that I have "entirely misunderstood the suggestion" he made, and goes on to say that he "does not contemplate the early possibility of anything like the telephoning of telegrams between London and Glasgow." The word I have italicised in his last-quoted sentence, shows with very fair clarity the idea at the back of his mind, for which as an enterprising member of the Telephone Service he deserves every praise. He should not, however, be cross with me because I happen to see how he dared to "dream dreams," which one day, I admit, may come true, but not, I fear, till after the demise of

J. J. T.

Extract from a proposed letter to a subscriber whose telephone lines were near bare power circuits:—

"The work is required in the case of your telephone installation
"in order to prevent risk to the Post Office servants and plant
"through induced electric currents."

Truly a little knowledge is a dangerous thing—though "an induced current" may not be.

NEW YORK WESTERN UNION.

An old-timer, who had not seen the inside of a large telegraph office in 25 years, paid a visit recently to this office. He was astonished to find the up-to-date methods of conveying the messages to and from the various desks. The check girls on roller skates also astonished him. He next found the messenger boys delivered telegrams to distant points using bicycles to expedite the delivery. He later found that the linemen went after wire trouble in automobiles. Then he asked what will be the development 25 years from now? Who can tell?—*Telegraph and Telephone Age*.

THE MILITARY MACHINE.

I HAVE mentioned the machine and the laity. But in fact we are all part of the machine. Not the army only is at war, but the whole nation. In the extremely brilliant French Yellow Book just issued, there is a very interesting passage in which the French Naval Attaché at Berlin relates how Prince Henckel von Donnersmark gave his reasons to a member of the French Embassy for thinking that Germany would vanquish France in a war. The aged Prince said: "I am convinced that you would be beaten, and for the following reasons. In spite of the brilliant qualities which I admit belong to the French, and which I admire, you are not precise. By precision I do not mean the fact of arriving punctually at an appointment, I mean punctuality in every sense of the word. The Frenchman, who has great facility for work, is not as punctual as the German in the accomplishment of his duties. In the coming war the victorious nation will be that nation whose servants, from the top to the bottom of the ladder, are exact in the accomplishment of their duty, however important or however trivial it may be."

Germany was fully entitled to offer this lesson to other countries. France has already magnificently learnt it. The English military machine is now a superb exponent of it. The civilian, who has no smallest share in the strictly military machine, but who belongs to the largest part of the national machine, may profitably remember, when he is pining for a rifle or cursing his middle-age, that by the daily practice of superlative cheerful conscientious exactitude in his own dull sphere, he can increase the efficiency of the national machine and so contribute to the success of our arms. Why, in these grand and terrible days a man may so sell matches on the kerbstone as to hasten the triumphant end of the War!—(Arnold Bennett in the *Daily News*.)

REVIEWS.

Handbook of Technical Instruction for Wireless Telegraphists. By J. C. Hawkhead and H. M. Dowsett, A.M.I.E.E. 2nd Edition. The Wireless Press, Ltd., Marconi House, Strand, W.C. Price 3s. 6d. net.—The generality of books dealing with wireless telegraphy may be divided into two classes. There is the scientific text book written by the mathematical physics professor for advanced students of electricity, and there is the cheap and snappy "all about wireless" type of book, written for the general public, usually by a journalistic gentleman whose knowledge of wireless is probably as profound and obtained in much the same way as that of the member of the staff of the *Exetanswill Gazette*, who reviewed the work on Chinese metaphysics.

Neither of these types meets the need of the practical wireless engineer or operator. The first would better be described as treatises on the theory of electric radiation instead of on wireless telegraphy. Although modern wireless telegraphy is based entirely on electric radiation, yet much of the mathematical gymnastics for which the theory of radiation offers such an enticing field is of no practical use to the wireless man. The writer would be the last to depreciate the value of mathematical investigations of this description, which are essential for the progress of the science. The engineer engaged in building a station, or the operator working it, however, seldom have the time or inclination for these intellectual recreations—they require information bearing directly on the work they have in hand. Even when books of this type do contain some really helpful information on the subject they profess to teach, this information is so buried away that it is almost useless. Constructional details, which are most important to the man who is actually "up against it," are usually altogether omitted.

Books of the second type are usually full of glaring errors, and in any case are far too superficial to be of any use to the man who really wants to *know*.

There is thus a need for a book on wireless telegraphy, which shall give as much theory as is requisite for a proper understanding of the working of the system, but which will also deal with the actual apparatus used, so that a man at a station can turn to it in difficulty and know that he will be able to find the information he needs. The first edition of the work under review was written for this purpose, and the steady demand which there has been for it shows that it met a real want.

A second edition has now been issued. This edition is considerably enlarged and has been brought up to date.

The book is divided into three parts. The first part deals with electrical theory, the second part with general Hertzian wireless telegraphy, and in the third part descriptions are given of special sets of apparatus.

The first chapter in Part I deals with elementary electrical principles, the second chapter with primary batteries, and the third with accumulators.

The fourth deals with the simple laws governing continuous currents, the fifth and sixth with magnetism and electro-magnetism, and the seventh with dynamo electric machinery and transformers.

The eighth chapter gives a simple account of the action of inductance in an electric circuit, the ninth chapter describes direct and alternating current measurements, and in the tenth chapter the nature of capacity and its effect on current flow in an electric circuit is discussed.

The two chapters in Part II deal respectively with the method of the production of electric waves and their application to the transmission of messages, and with the various forms of apparatus used to detect the waves at the receiving station.

In Part II detailed descriptions are given of various Marconi sets of apparatus, aerial construction, the use of the wave meter, and the methods of testing for and removing faults.

The book is very fully illustrated with diagrams, engineering drawings, and photographs, and, as will be seen from the brief sketch given above, the ground covered is such that the wireless operator, who has, perhaps, only this one book available, will be able to obtain practically all the information, both theoretical and practical, which he needs. It does not, of course, pretend to give

all the information needed by a wireless engineer. In fact, we are not acquainted with any book at present which can be said to deal with wireless engineering—as apart from academical wireless—and there would certainly be a demand for such a book if it were produced. But in its own field, among wireless operators, "Hawkhead" is a well known and trusted friend, and we feel sure that "Hawkhead and Dowsett" will meet with a similar welcome and take a similar place in wireless literature to that of the earlier book.

The Telephone and Telephone Exchanges: Their Invention and Development. By J. E. Kingsbury, M.I.E.E. Longmans, Green & Co. 12s. 6d. net.—There is such a wealth of material in this

LIST OF SUBSCRIBERS.

New Haven District Telephone Company.

OFFICE 219 CHAPEL STREET.

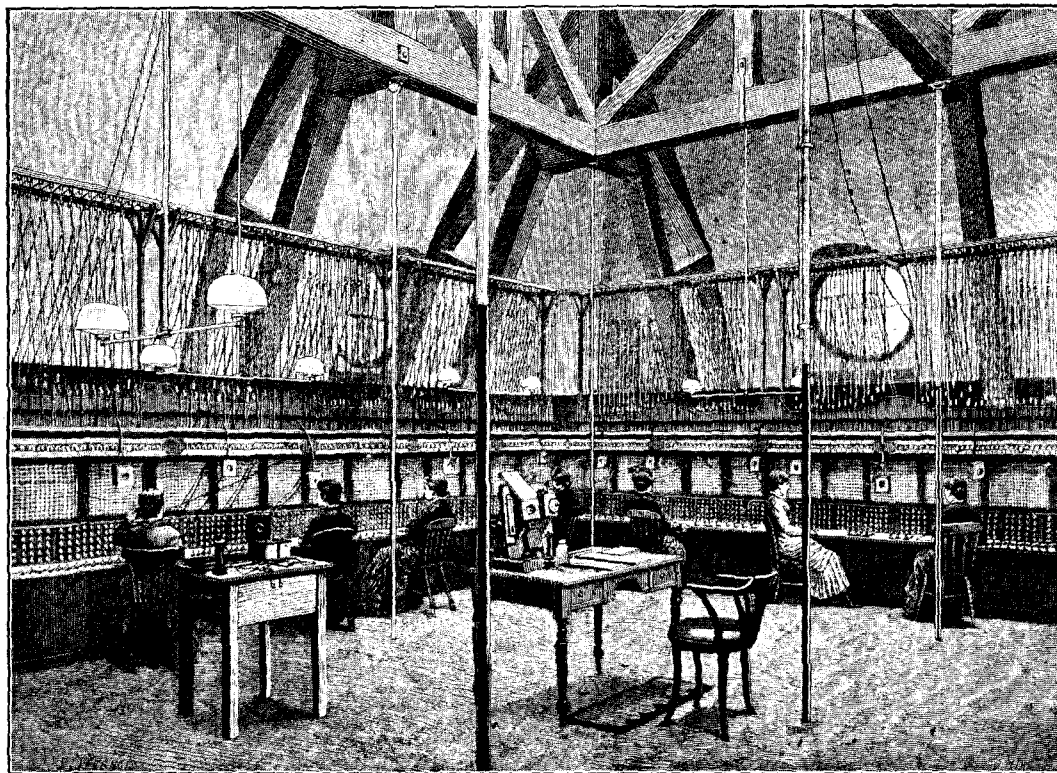
February 21, 1878.

Residences.	Stores, Factories, &c.
Rev. JOHN E. TODD.	O. A. DORMAN.
J. B. CARRINGTON.	STONE & CHIDSEY.
H. B. BIGELOW.	NEW HAVEN FLOUR CO. State St.
C. W. SCRANTON.	" " " " Cong. ave.
GEORGE W. COY.	" " " " Grand St.
G. L. FERRIS.	" " " " Fair Haven.
H. P. FROST.	ENGLISH & MERSICK.
M. F. TYLER.	NEW HAVEN FOLDING CHAIR CO.
L. H. BROMLEY.	H. HOOKER & CO.
GEO. E. THOMPSON.	W. A. ENSIGN & SON.
WALTER LEWIS.	H. B. BIGELOW & CO.
	C. COWLES & CO.
	C. S. MERSICK & CO.
	SPENCER & MATTHEWS.
	PAUL ROESSLER.
	E. S. WHEELER & CO.
	ROLLING MILL CO.
	APOTHECARIES HALL.
	E. A. GESSNER.
	AMERICAN TEA CO.
Physicians.	Meat & Fish Markets.
Dr. E. L. R. THOMPSON.	W. H. HITCHINGS, City Market.
Dr. A. E. WINCHELL.	GEO. E. LUM.
Dr. C. S. THOMSON, Fair Haven.	A. FOOTE & CO.
Dentists.	STRONG, HART & CO.
Dr. E. S. GAYLORD.	
Dr. R. F. BURWELL.	
Miscellaneous.	Hack and Boarding Stables.
REGISTER PUBLISHING CO.	CRUTTENDEN & CARTER.
POLICE OFFICE.	BARKER & RANSOM.
POST OFFICE.	
MERCANTILE CLUB.	
QUINNIPAC CLUB.	
F. V. McDONALD, Yale News.	
SMEDLEY BROS. & CO.	
M. F. TYLER, Law Chambers.	

Office open from 8 A. M. to 2 A. M.
After March 1st, this Office will be open all night.

FACSIMILE OF THE FIRST TELEPHONE DIRECTORY, NEW HAVEN, CONNECTICUT.

book, covering the whole territory of telephone development, telephone organisation, invention and commercial application, rates and charges, that it is almost impossible to give, in the space of a review, a full survey of its contents. Mr. Kingsbury has dug into an accumulation of records, the existence of which was known to many of us but which has been hitherto unavailable, and he has recounted the story of American development fairly and readably as a result of his enthusiastic research. We shall differ from some of his conclusions, but not without paying a tribute to the scrupulous



MULTIPLE SWITCHBOARD, LIVERPOOL, 1884.

From *The Electrical Review*, Oct. 18, 1884.]

[By permission of Messrs. Longmans & Co.]

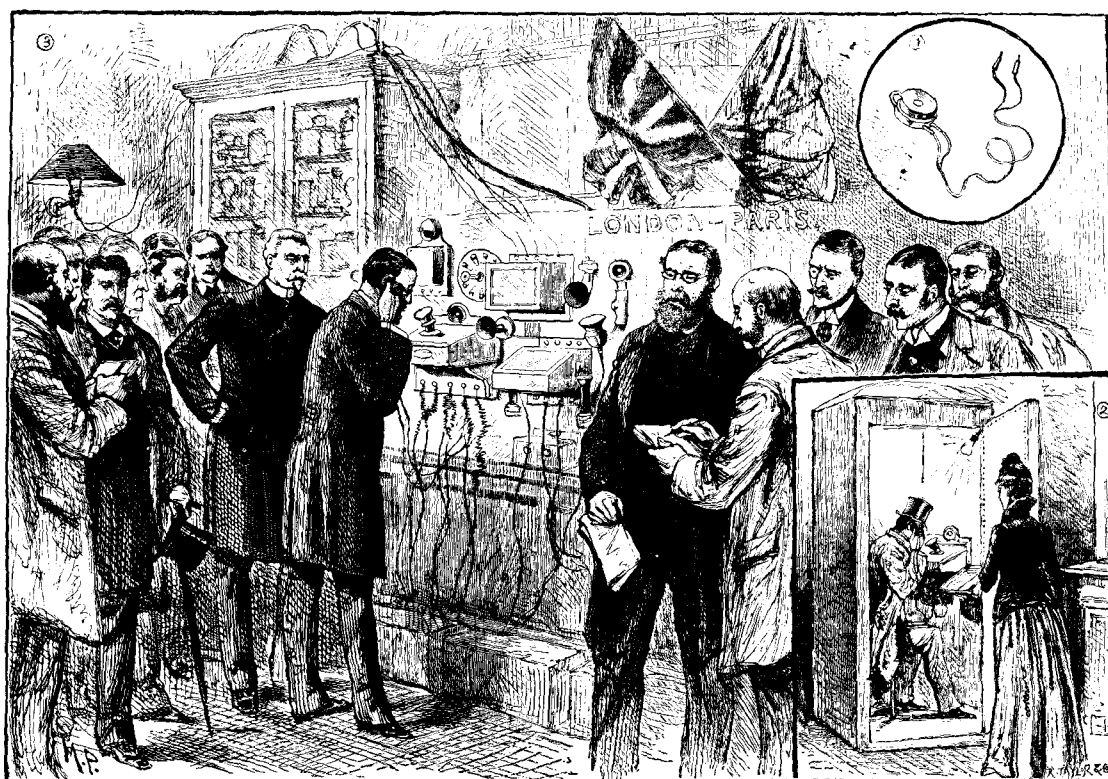
fairness and balance of mind which he shows. We do not expect a book of this kind, having its centre of gravity, so to speak, in the United States, to see the advantages of Government ownership as we see them, but for all that we might urge that there is rather more to be said on behalf of Government ownership than Mr. Kingsbury states. And at this moment, if he knew all the ramifications of the Telephone Service in behalf of national safety, he would find it difficult to indicate how any privately-owned company could possibly have adapted itself to national needs. Other causes operated in producing in England the State ownership of telephones, but even if they had not operated it is exceedingly probable that to-day, for different reasons—which cannot all be stated—State ownership would have been inevitable. The rector of Mullion is quoted as proving the inefficiency of coast communication in 1870. Those who know the conditions to-day are hardly impressed.

We begin with the consideration of the art of speech. Platform oratory is at a discount now, but the foundation of the utility of the telephone lies in the "magic and mystery of speech," at its zenith in the Victorian epoch. So Alexander Bell and his son, Alexander Melville Bell, were professors of elocution. Chance turned their zeal from the production of successors to Demosthenes to the assistance of the world at large to cultivate the tongue instead of the pen. So in 1875 we find a letter which declares that "such a chimerical idea as telegraphing oral sounds would indeed to most minds

seem scarcely feasible enough to spend time in working over." Time passed quickly. In 1876 Lord Kelvin spoke with "much enthusiasm of the achievement," and Alexander Graham Bell had triumphed. We had passed from "pantomime, the first speech of man," evidenced in Chappé's semaphore, to the transmission of vocal speech.

Mr. Kingsbury takes us genially and yet thoroughly through all the details, the use of the undulatory current, the microphone, and he gives us a clear view of the development. A county rectory in England produced one of the most notable improvements. The Rev. Henry Hunnings found time, in the midst of his parochial work at Bolton Piercy, in Yorkshire, to invent a transmitter which with Edison's and Blake's transmitters and then great David Hughes' discovery of the microphone brought the telephone into the arena of practical use. In 1878 the New England Telephone Co. was incorporated, as a result of the study of exchange methods. These methods had been adopted in England for telegraphs. [By the way there is a slip on page 207 where Mr. Kingsbury says that in Europe there were no district telegraph systems.] On Sept. 6, 1879, *The Times* describes the new London exchange system, and we find that

there were ten stations in London—in Copthall Buildings, in Old Broad Street, in Suffolk Lane, in Lombard Street, in Princes Street, in Lincoln's Inn, in Queen Victoria Street, in George Yard, Lombard Street, in Throgmorton Street, and last of all *The Times* office. In 1880 the Directory contained 172 name and the central exchange was moved to No. 11, Queen Victoria Street, not far from the hub and centre of the present London Telephone system.



INAUGURATION OF LONDON—PARIS LINE.

From *The Illustrated London News*, March 28, 1891.]

[By permission of Messrs. Longmans & Co.]

All manner of controversies and conflicts entered. Mr. George Bernard Shaw is quoted, not on the drama, or on Fabian politics, or on the true nature of the Irishman, but as holding the view that the Edison telephone was "nothing less than a telephone of such stentorian efficiency that it bellowed your most private communications all over the house."

The story of the multiple switchboard gives us Mr. Kingsbury at his best. Several new facts are brought out clearly, and several old facts are shown in truer proportion. On outside construction there is an exceedingly interesting chapter which recounts Sir Francis Ronald's demonstration in 1816 in the gardens of the house which afterwards achieved world-wide fame as Kelmscott House. "In Great Britain the first telegraph lines were laid underground, and it was intended that the first in the United States should also be so laid." It is a little startling to read of the activity between 1850 and 1854 in laying underground wires such as London-Dover and London-Liverpool. The life of the lines was short: they were condemned in 1857. But some of the German undergrounds laid in 1876 are said to be still working. The story of the later development in the United States in connexion with loading coils is given with full detail, but we miss the romantic suggestion which has been made that President Taft's annoyance with the elements of snow and wind for destroying the effect of his inauguration speech was the true cause of the development.

There is a little more occasion for difference with Mr. Kingsbury in his treatment of common battery development, though it makes one of the issues concerned with this discovery much clearer, and in respect of automatics—so-called, as Mr. Kingsbury would say—there is much ground for discussion. Assuredly he puts the value of "machine telephony" too low when he claims that, as happened with the call wire, it will prove to be rather a device for internal use than for use by the public. And we are not at all sure that the particular kindness with which, in a later chapter, government administrations are said to look upon "automatics" is due to some inherent defect in discipline. It is an old bogey and should be laid. Government service cannot quite so readily as a private company pile up the scrap-heap of human *debris*, but it has its own disciplines, and it is not the case that private administrations can mete out the ruthless penalties for inefficiency in the way described by some of their admirers.

The story of the telephone in England has its sad side, and Mr. Kingsbury does not relieve the darker shades. There were blunders, no doubt, but those blunders were made with the clear vision throughout that Government ownership was inevitable. The difficulty was how to bring about Government ownership with a large corporation in possession without in the meantime putting that corporation in so strong a position as to make Government ownership so costly to the public funds as to begin with a handicap. Granted that *ex parte* the description in this book of the high politics is a fair description, yet it does not make due allowance for the difficulties which stood in the way. And those of us who bore some of the brunt of the organised assault after the transfer are not quite so clear in our minds as Mr. Kingsbury that it was an assault not on officials but upon political persons in the by-gone past. Some day the full story will be written. We are too near the events to get a true perspective. And then it probably will appear that all the blundering was not on one side.

To say this is not to find fault with this book. It has its point of view and a perfectly legitimate point of view. But what is of more advantage it is an indispensable book to all who wish to know the full story of telephone development, so far as it has been revealed. And it is packed with interesting touches. Vacuum cleaners were first used in telephone exchanges. There were appointment calls in the earliest days of long distance telephones. And in June 1864 the average price of a telegram was 7½d., just as it was in June 1914. And in *All the Year Round* in 1859 we read that there was in London "a graceful school of about 60 young ladies even now learning the mysteries of the telegraph," and nearly 60 years afterwards there is still "the graceful school," and we are all convinced that as in 1859 "whatever machine may be used at the central and district stations it is certain that the sub-district or shop station will require something exceedingly simple and convenient."

Lastly, with some feeling of sadness, we find that in the London district more than forty years ago "the actual price of a message of fifteen words is rather under two-pence halfpenny." It is startling.

HIC ET UBIQUE.

CHICAGO has now 400,000 telephones within its city boundaries. There were 104,338 telephones in 1905, so that the number has nearly been quadrupled in ten years. The ratio of telephones to population is about 1 to 6½. New York, we learn from the same source, *Telephony*, has now within its metropolitan area 428,750 telephones, Philadelphia 150,400, Boston 88,100, Pittsburgh 76,140, and San Francisco 118,217. In no case are suburban districts included in these figures.

Telephony, in its next issue, describes one "Lecturer Casson" as telling the big metropolis (London) that its telephone system is "on the blink." We have not the faintest idea what this signifies, except that we imagine it is not commendatory. He says that New York has 600,000 telephones, which is a goodish advance on 428,000, but no doubt he is including the suburbs. Indeed, one of our own contributors on page 222 of our July issue estimated the number of telephones in New York at from 500,000 to 550,000. It is one of the advantages of the vagueness of telephone geography that for polemical purposes you can always extend the radius of a given town by 5, 10, 20 or 50 miles at will. "But," continues Mr. Casson, "in London we have not more than 220,000." As a matter of fact there were 267,578 at the beginning of the year. The way of the telephone critic is simple. Add 50,000 telephones to the system you are praising, deduct 50,000 from that which you are deprecating, and trust to your readers to know no better.

THE London Telephone and Telegraph Society has during the past fifteen months forwarded a copy of the *JOURNAL* monthly to those of its members who are at the Front or in camp. We have been gratified to receive several letters from these members signifying their appreciation both of the *JOURNAL* and of the kindness of the society. "May I take this opportunity," writes one, "to thank you for the copies which have come to hand so regularly during my eight months at the Front. They have been most interesting and, moreover, have provided a strong link with the old peaceful and civilised life." "I have always passed my copy round amongst my colleagues," writes another, "who have expressed their appreciation of the general utility of the *JOURNAL*, and also of its absorbing interest."

We have received from the Sheffield staff a booklet entitled "Greetings," which has been produced by them and is addressed "To the Staff on Naval and Military Service, from the Staff at Home." It contains the Roll of Honour for Sheffield, anecdotes, verse, items of information, and greetings from various Sheffield postal, telegraph and telephone associations and committees. It is a credit to the producers and altogether a very happy thought.

WE regret to note that in our Monthly Record of Brave Deeds, in the December issue, Second Lieutenant M. H. WILLIAMS was by a printer's error described as Williamson.

THE other day somebody on being taxed with calling a telephonist a "saucy cat," denied the impeachment. He said he might have made a remark over the telephone about a "saucy kid," but he was not referring to the telephonist.

This recalls a subscriber who, having been cut off for outrageous language to the operator at his exchange, explained that really he was swearing at his dog, who had just then ran between his legs.

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising { Mr. JOHN LEE.
Committee - - { Mr. J. W. WISSENDEN.
Managing Editor - - Mr. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

JANUARY, 1916.

[No. 16.]

THE STATE-OWNERSHIP OF TELEGRAPHS AND TELEPHONES.

To a dinner given by the California Railway Commission, Mr. Theodore N. Vail added an unusual delicacy. The walnuts and wine (unless the dinner took place in a prohibition State) were commingled with an onslaught on the Government ownership of telephones. After all was said, the point at issue is exceedingly fine. "Control and regulation," in its latest form, gives to the Public Utility Commissions the control of capital, the regulation of the amount of capital on which dividend should be paid, the regulation of interest, the regulation of tariffs and services rendered. The distinction between this arrangement and full Government ownership is not very considerable; at best it is only a question between the State itself owning the capital on the one hand, and the State controlling that capital, its amount, the use to which it is put and the interest which it shall bear, on the other hand. So it is hardly worth while spoiling the consummation of the California Railway Commission's dinner (wherever it took place, for *Telephony* does not tell us) by a fierce dialectic on so small an issue.

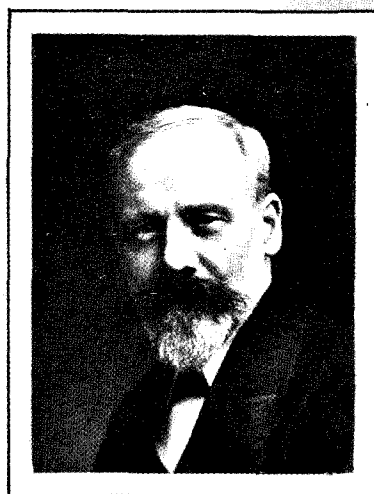
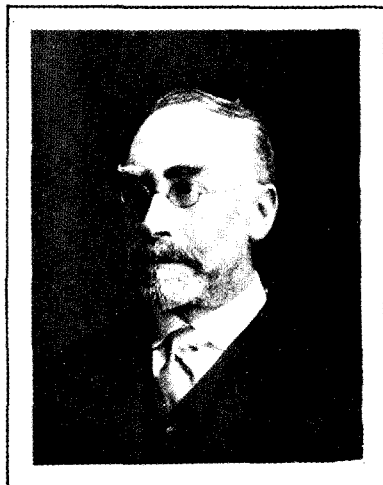
Incidentally, however, Mr. Vail produced some figures which we examine in another column. That examination proves that in the detailed accounts of large Government-owned industries there are factors which differ considerably from those bearing the same name in privately-owned industries, notably, the pension account. And the summary judgment which Mr. Vail gives of the efficiency of our Service needs careful consideration before it is accepted, and here again we supply some useful figures for comparison. Even if English newspapers labour under the disadvantages of a censorship to-day, they would have told us, if it were true, that the public was "clamouring for a Service free from political and Parliamentary control." If there is any clamour at the moment it is that the State shall continue the ownership of the railways which temporarily it has had to assume. There is one hint which

may be given touching a matter which cannot be discussed fully. All means of communication are so important during war that State ownership is inevitable. The United States, happily, is free at the moment from the pressure of this argument. But defence does not end in building warships; it may necessitate the supply of unremunerative telegraph and telephone offices at all manner of distant points. State ownership does not come about as the result of pleasant conversations after dinner, but—witness the State of Alaska—as the result of growing corporateness and intensity of national life, which cannot afford to allow the means of defence to be in other than the hands of the State.

This is the root difference between State ownership and the method of control and regulation. It means that it is the State as a whole which is to be served, and not particular telegraph and telephone communities here and there. It has nothing to do with personnel. We are enthusiastically with Mr. Vail in his passion for expert control, for enlightened study, for industrial boldness, and without any mock modesty we admit that there is a great deal to be learned from his unique insight and wide experience. The State can so construct its telegraphs and telephones as to make profit on every section of the system. But no State has ever done so, for the simple reason that each State has had to keep a kindly eye on other aspects of the utility of telegraphs and telephones beyond the transmission of public telegrams and the provision of means for public telephone conversation. Public Service Commissions can hold the reins of private companies, however large the operations may be: these Commissions can reduce the companies' capital, can modify their dividends, can reduce their tariffs, and can force them to give a better service, ~~the State~~. The State can suggest that these national services should be rendered, but it will have to pay the private companies for rendering them, and it may say in the last resort that rather than pay the piper it proposes to play the tune. It would take even more eloquence than Mr. Vail's to persuade the British public to hand over the telegraphs and telephones to any sort of private ownership, however stringently controlled. For when the public sees in a newspaper that a certain German agent was caught, in spite of his cunning use of the telegraph system, it would rather be quite sure that it controls the telegraph system directly. We put the argument vaguely, but so we must, since the case for Government ownership has been strengthened since August 1914 by incidents to which detailed reference is impossible.

THE WAR AND TELEPHONE EXPANSION.

ONLY four months of the year 1914 were occupied by the European War, but they were sufficient for the great conflict to set its seal on the telephone development of the world. Of the principal telephone-using States at the end of 1913 the United States possessed nine million telephones, Germany nearly a million and a half, Great Britain three-quarters of a million, Canada half a million, Russia and France each over 300,000, Austria-Hungary, Sweden and Japan over 200,000, and Australia and Denmark about 130,000 each. All these countries with the exception of the United States, Sweden and Denmark are now at war, and in these circumstances the usual statistics of their annual development are, of



Mr. L. T. HORNE, (*Assistant Secretary*).

Mr. EVELYN MURRAY (*Secretary*).

Mr. A. B. WALKLEY (*Assistant Secretary*).

Mr. H. S. CAREY, C.B. (*Second Secretary*).

The Rt. Hon. HERBERT SAMUEL, M.P. (*Postmaster-General and Chancellor of the Duchy of Lancaster*).

Col. A. M. OGILVIE, C.B. (*Second Secretary and Director of Army Signals, Home Defence*).

Sir W. SLINGO (*Engineer-in-Chief*).

Mr. H. PIKE PEASE, M.P. (*Assistant Postmaster-General*).

Mr. G. MORGAN, I.S.O. (*Controller, Post Office Stores Department*).

Sir CHAS. KING, C.B. (*Comptroller and Accountant-General*).

The Postmaster-General, the Assistant Postmaster-General and the principal Officers of the Telegraph and Telephone Services wish the readers of the "Telegraph and Telephone Journal" a prosperous New Year.

course, not available. From the statistics of our own country's progress and the returns which have been received from some of the neutral States, however, we are able to gauge how lamentable has been the effect of the war on telephone progress in 1914.

It might have been supposed that the increased trade which the war must of necessity have occasioned in some at least of the neutral countries would have given an impetus to telephone development. This, however, hardly seems to be the case judging by such annual reports as have been made public. In America the Bell Telephone system and its connexions, which control about eight-ninths of the telephones in the United States, showed an increase of 676,943 as against 823,449 in the previous year. In Sweden the State system increased by 10,452 stations as against 10,880 in 1913, although the Stockholm Telephone Company with an increase of 9,000 as against 7,000, brings the total increase for Sweden up to 19,358 stations compared with 17,819 in the foregoing year. In Denmark the increase for 1914 is about 7,000 as against 12,000 in 1913, but these figures relate to March 31, covering seven months of the war. In this country there was an increase of 20,000 stations compared with 40,000 in the previous year, which in all the circumstances may be considered as not unsatisfactory. Various newspapers reported a large number of cessations in Germany at the beginning of the war. Whether these reports have any official foundation, whether the decrease has been made good, or whether it has been maintained we do not know, but it is extremely unlikely that France, Germany, Austria or Russia with their incessant military preparations showed a net progress during 1914. The returns for the Dominion of Canada which are made up to June 30 have not yet been published, but in British Columbia, one of the most progressive of its provinces, we observe a complete stagnation in 1915 which may afford some index of the position of affairs in Canada.

It has been estimated that there were about 14,500,000 telephones in the world at the beginning of 1914, an increase of upwards of a million for the year. The increase for 1914 was probably little over 830,000, of which 700,000 were in the United States. Thus, as we have remarked before in these columns, the prospect of making good the arrears of telephone development in Europe would seem to be indefinitely postponed. We may well apply the old tag *ex pede Herculem*, for if the mere foot of the Great War in 1914 produced such a retarding effect on telephone expansion, what will the gigantic body of the colossus not produce in the whole of 1915? We shall hope to give some further indication of the progress of telephone development during the war in two or three months' time, when the figures from Canada and from some of the neutral countries are available. Whether those extensive and invaluable systems of telephone communication which exist on the various fronts, and between the fronts and their bases and headquarters, can in any sense be regarded as a set-off against the dismantled systems of districts devastated by battle and against the stagnation of normal development, is a question for argument; that they will form a brilliant page in telephone history cannot be denied, but their usefulness is of too exclusive and too transient a nature to justify from an economic standpoint their inclusion in a review of the telephone development of the world.

THE BACILLUS OF SLOTH.

WE should love to know Mr. Carter of Hong Kong and that friend of his with inside knowledge of the National Telephone Company's system whose quaint statement is reproduced in another column. Ah! most dearly should we love to know the identity of the latter, whether an old Company's man or merely an *amicus curiae*. In these days when little excitement falls to the share of those not of military age, we welcome the news of a miracle in our midst and hail with delight its vagaries. Let us have the facts as those gentlemen believe them. At midnight on Dec. 31, 1911, a flock—or should it be a herd—of bacilli fell on the British Islands and selected for their prey only those worthy souls—spread far and wide over the land from Lands End to John O'Groats and from Bacton to Blacksod—who had earned lifelong gratitude from a nation of shopkeepers by their energetic services to the National Telephone Company. Mind carefully the fact that this was on Sunday night—not on the preceding Saturday night when many of the victims met to celebrate in anticipation "*le roi est mort, vive le roi*" with cakes and ale at the Holborn Restaurant! If the way home of those roysterers was devious and their arrival tardy, the bacillus was not to blame. But after a Sabbath spent in a hundred and one different ways, they fell a prey to the treacherous bacilli. And on Monday morning they were all "less efficient in performing their various duties than they were the day before." Most of them did not work on Sunday; but what does that matter! They were not suffering from the ordinary Monday morning feeling engendered by too much golf, or what not, on the previous day but from a serious complaint which led to a hopelessly inefficient telephone service. There is no doubt about it, from that day onwards they were slothful civil servants.

History fails to tell whether those officers whose services were retained for a time by the Company in connexion with the arbitration proceedings were temporarily immune from the attacks of the germs; and if so, what process of inoculation, antidote or germicide was used to secure such a result. We do know, however, that the Company with the aid of the germ-ridden staff conducted its case before the arbitrators with ability, vigour and vim. The miracle was why did the telephone service not become hopelessly inefficient. Statistics show us that there has been a progressive improvement from that fateful Sabbath as compared with the halcyon days of yore. Can it be that the telephone service was so perfect that the slothfulness of the individual had no effect on it? Or is it really true that the slothful civil servants who were already in the Post Office service managed to save the situation? A happy thought! The bacilli must have died at birth, or Mr. Carter's faithful friend was merely "pulling his leg."

THE LONDON TELEPHONE AND TELEGRAPH SOCIETY.

MR. H. C. GUNTON, the Principal Power Engineer, has consented to give a paper on labour-saving devices before the Telephone and Telegraph Society of London. The title of the paper will be "Post-War Policy in relation to Labour-Saving Devices," the date is Monday, Feb. 7, and the meeting place will be the Institution of Electrical Engineers as usual.

TELEGRAPHIC MEMORABILIA.

IN a recently published series of sketches, entitled "Alliterations for Allemands," *Punch*, generally so well to the fore, gives an anything but up-to-date view of a German telegraph office, although the picture of the Ten Tortuous Teutons Telegraphing Tosh is simply delightful. Why artists should insist upon depicting the single needle as typical of a 20th century telegraph office can only be explained by the assumption that this impression has been gained by odd half-hours spent at Mugwumpton and other kindred railway junctions. But why not at least have introduced a real Teutonic *klopfer*?

The following phonogrammatic error, it is reported, was corrected just in time to prevent consternation in a certain Provost Marshal's office:—"Arrest Private John Jones, No. —, have some tea and report." The friendly censoring of this telegram by a vigilant overseer who changed the italicised words into "absentee" prevented any doubt as to the original meaning of the text. "Sending fur cow parcel post" was another rendering of "Sending fur coat, &c." Evidently not a phonetic error this time!

An officer well versed in matters telegraphic, and but recently returned from Russia, speaks very highly of the skill of Russian Wheatstone telegraphists. He was especially interested in the light "sticks" employed, but unfortunately did not bring back a sample pair! It is contended that the deftness of Russian experts in the use of this type of telegraph apparatus is really wonderful, but perhaps he never had the opportunity and privilege of watching the C.T.O. "News" in its palmiest days!

It was fitting that the King of the Belgians should have exchanged greetings with the Cable Room staff on the anniversary of his natal day, seeing the close connexion between that monarch's office "somewhere in Belgium," and the other end of the wire. The words of that heroic personality were as full as ever of quiet confidence, mingled with gratitude for sympathetic remembrance.

During a recent Continental breakdown, which reduced the number of available Anglo-Continental wires to a very limited figure, the value of the Baudot duplexes to France was again demonstrated and emphasised. Three wires which not so very long ago would have yielded but one single channel each, by careful adjustment, coaxing and nursing on this side of the Channel, and by equal co-operation on the other, multiplied this number fourfold and saved the situation.

It should be noted that these results could not be obtained, or if obtained could not be maintained, without skilled technical attention, and even in these times of restricted staff it is found to pay well to expend a pound or two on expert supervision of what may be termed the "machinery" of duplex Baudot in order to obtain the maximum output under varying conditions. It is not a case of "a child can use it!"

The twin triple Baudot (two wires six channels) on the longer French wires, when the latter are in a somewhat shaky condition, has also provided one of the most stable sets of communication London has ever experienced in its Continental telegraph communication. It says not a little for the apparatus, at both ends of the wires, that a continuous run of over 100 hours should be possible on apparatus of this description.

One can sympathise with the Indo-European telegraph staff in their recent position at Kum telegraph office, a few miles south-west of Teheran, which office was seized by the enemy who cut the wires and thus left some considerable doubt as to the fate of the party in the minds of their colleagues, who were thus unceremoniously cut off from communication with them. This doubt and anxiety would be heightened by the knowledge that the city is a particularly fanatical one containing a mosque in which ten Persian kings lie buried in an equal number of gorgeous sarcophagi, the latter fact adding considerably to the possibilities of frenzied religious outbreaks against Europeans.

More and more is it evident that but for female labour the Telegraph Service would have been in a very poor way long ere this, owing to the continual demand by the military authorities for skilled telegraphists, and the Cable Room has at last succumbed to the strain of losing one-third of its staff. It is probable that

before the new year has well got into its stride certain circuits will be "manned" by women who have proved suitable for the work, which, despite all contentions to the contrary, is by no means of the easy simple kind so frequently associated with outside knowledge of the telegraphs.

There is naturally a feeling of regret, even fear, lest men should be ousted definitely from their positions with the return to normal times—a feeling not without kinship to similar feelings regarding a similar condition of affairs in certain "outside" employments. Seeing the very definite pledges which have been given, this feeling would appear to be groundless so far as the Government Services have been pledged to a return to the *statu quo* conditions, but, if it was once written

"For men must work and women must weep."

it is certainly now the time

"When women must work and men must fight."

One of the latest reports from India brings the interesting news of the installation of Creed printers during the war-period of 1914-15, sets having been installed at the Calcutta and Rangoon offices. "The advantage of saving the labour of transcription has been great during the past year, when the staff has been depleted owing to the absence of a considerable number of telegraphists on field service," says the official report. The same report, signed by the Honourable Mr. C. H. Harrison, I.C.S., Officiating Director-General of Posts and Telegraphs, goes on to say: "The Baudot apparatus continued to prove very useful for rapid disposal of traffic on heavily loaded circuits. The total number of messages of all classes dealt with on this system by the offices where it is in use amounted to 7,605,779, which figure represents a very considerable proportion of the total traffic dealt with by those offices."

One feels inclined at times to let one's self go on the very specially confidential nature of much of the Home telegraph work during the present war period, if only for the sake of one word of appreciation to the many officers who so unostentatiously and with sealed lips so faithfully perform this necessarily obscure service to the Empire. It is at such times as these that one requires all one's self-restraint, and one can therefore welcome more sincerely the spirit of appreciation which permeates so thoroughly last month's leader on "Industrial Relations." There is no direct reference to work done or service rendered, but there is a subtle appeal to all ranks for recognition of the position, duties and responsibilities of "the other man," a call for something approaching real co-operation, a something alien to that water-tight compartment cry of one section, one department or one officer to another, of "Why should we assist?"

J. J. T.

POST OFFICE RELIEF FUND (BELFAST COMMITTEE).

A concert arranged by the above committee was given in the Ulster Hall, Belfast, on Tuesday, Nov. 2, and was very successful, the accommodation of the hall being taxed to its utmost to contain the audience. After paying expenses the committee remitted £249 4s. 6d. to Mr. A. G. Ferard, the hon. secretary of the fund.

The local committee were as highly pleased with the financial result as the audience were with the musical fare provided. At the outset it was decided that to bring the best talent available would be the surest means to obtain substantial support from the public, and so it proved. The artists were Miss Jean Nolan, mezzo soprano (Dublin); Miss Gertrude Fuller, violinist (Solihull, Birmingham); Madam Maria Levinskaja, pianist (Moscow); Mr. Percy Whitehead, baritone (Dublin), and Mr. Frank Mullings, the English dramatic tenor. The accompaniments were undertaken by our townswoman, Mrs. Herbert Warnock and were voted by the Press to be a feature of the evening's entertainment. All the artists were in splendid form and gave a good account of themselves.

On the local committee all branches of the Service are represented. The Postmaster, Mr. S. G. Forsythe, is chairman, and Mr. J. R. Garr, hon. secretary.

It may interest our readers to know that the telephone branch is represented by Mr. Archer Smith, the District Manager, whose interest in all the activities of the fund is most keen, and he is loyally supported by a very patriotic staff who follow closely the fortunes of their members who are absent with the colours. They seconded Mr. Smith's efforts for the concert in a most practical manner, viz., by disposing of almost 200 tickets amongst their friends.

It is understood this is a record donation from any local committee, but in the interest of the fund our Belfast friends do not care how soon it will have to take a lower place.

TELEGRAPHS IN INDIA.*

BY J. J. TYRRELL.

ALL human experience is of value to someone, somewhere, although no personal pretension is made that any experiences of mine are likely to add much to the world's knowledge.

I have, however, felt that duty to our society demands that each member should open wide and freely the pages of his or her professional note-book for the benefit of the membership. In this spirit I beg to submit my paper on the Telegraphs in India.

Much of the matter now to be submitted is the result of an official visit paid to India a few years ago during the installation of the Baudot system there, and the personal references will therefore be understood; the remainder of the information is culled from both official and private sources. If then, one particular type of apparatus should loom rather large in the picture you will understand the reason of the predominance, and if in the course of my remarks I should appear to drift away from matters telegraphic, or at least from matters pertaining to the Post Office, please remember that my point of view is simply this, that this apparently "extraneous" matter not infrequently forms the necessary setting to the Indian Telegraph system, is indispensable to a better understanding of Indian conditions, and is an attempt to provide the very atmosphere in which the Indian Services live and move and have their being.

At that much abused outpost of India—Aden—we made our first acquaintance with an Oriental telegraph office of grade x. Landing one moonless evening we were rowed ashore by a couple of Somali boatmen, and after clambering up the slimy landing steps we were met by a squabbling crowd of native watermen, who threatened to end their domestic difficulties by the precipitation of the entire company into the black and shark-ridden waters. This preliminary and informal reception over we made our way through the semi-darkness of the oil-lit streets, one of which, camel-impregnated, sandy and dusty, led up to the telegraph depot. Groping towards a narrow-grated window low down on the ground the "office" was discovered behind half a dozen iron bars. Through these we negotiated our telegraphic business with bent backs and by the aid of a vile paraffin lamp, a type of which we were to see—and smell—many many more.

It was an absolute act of faith to place good coin of the realm through those bars, in the hope of telegraphic service to be rendered, not less an act of faith than trusting ourselves anew to our Somali oarsmen and their cockleshell of a boat out into the inky blackness of the harbour in search of our steamer. The latter we discovered by bumping into the anchor-chains!

Eight or nine days steam brings the voyager into an environment of amazing contrast to this rainless arid district. No greater contrast possibly exists than the rocky shores and hinterland of Aden, and the sandy beaches and luxuriant vegetation of Ceylon, particularly when one lands at Colombo with its magnificent harbour, its large offices and shops, its palm-shaded, wide and well-kept thoroughfares, and its well-clad if over-obsequious attendants at the palatial post office.

It is not my province to linger over the "land of spicy breezes where only man is vile" except to protest that there are other things more vile than man in the island and breezes which are anything but "spicy."

There is, however, another member of the C.T.O. who has made the island somewhat of his own speciality, and I fear to trespass; moreover, I will further confess that I have no right to impose Ceylon upon my audience for the simple reason that although Aden, eight or nine days' voyage away, comes directly under the control of the India Office, Ceylon, which is only one or two hours' steam from the Indian mainland, is governed by the Colonial Office and is thus ruled distinctly and completely from the very peninsular of which geographically it at one time formed a part.

Hindoo legends explain that Ceylon became detached from India during one of the terrific battles of the ancient gods who, being hardly pressed called upon the Monkey King and his hordes to assist them. The latter monarch consented and, in the struggle which ensued, snatched up the piece of earth now known as Ceylon and hurled it at the enemy, whom it annihilated, the missile then falling into the sea due south.

History and the British Government have apparently perpetuated this "detachment" for, the coinage, the postal and telegraph arrangements, and the finances of the island are quite separate from those of India itself. Cingalese coinage is not valid in India, and stamps bought in Ceylon can no more be used for postage from India than British stamps can be used in New York or Petrograd.

One cannot visit India for business purposes, certainly not for business purposes of a great State department without being compelled to study, in some measure at least, the various physical, racial, and geographical conditions which obtain when traversing from north to south, and from east to west, not forgetting that further study the general psychology of the native as a conglomeration of tribes and races.

Intense heat in the plains by day, and bitterly cold nights, snow-swept heights as in the higher hills, with an occasional oasis of a temperate zone such as in Bangalore.

Waterless, sandy wastes, devoid of a blade of grass, luxuriant jungle and swamp, fertile valleys, hundreds of miles of country with a rise of but half a dozen inches per mile contrasted with mountains that rival Switzerland for beauty and South America for altitude.

Then there is a population of over 300 millions to consider, split up

into no less than 83 principal castes which also have their sub-divisions; a combination of races and tribes speaking no less than 185 languages; a country where thousands can, and do support husband, wife, and family on less than twopence per day, and where princes and rajahs thrive and out-rival American millionaires in their riches and display. A population which ranges from the most ignorant, illiterate practisers of superstitious, filthy and repulsive rites, up through all the gradations of civilisation to the refined scholar and devotee whose ideal is a worthy selflessness, and who can discuss the deepest books of Western civilisation with consummate ease, and with marvellous subtlety of thought, if at times with hair splitting annoyance.

Generally speaking, the native is shy of innovation, and to overcome that shyness one cannot always approach by European highways, but rather by native bye-ways of view and thought. For example, much reluctance was at one time evidenced to the use of the railways, but it was no blazing advertisement of 60 miles per hour expresses that lured the native into the "fire-ghari." More subtle indeed was the wile, and that by his own countrymen, for there is a pamphlet in dialogue form, presumably written by native religious leaders which details a discussion by two Hindoo gods on this very question. These deities argued that as the railway would bring more pilgrims to the shrines, the invention was a good one, and should be encouraged. That proved a clinching argument!

Down by the sacred Ganges, at one of the festivals, an old man was knocked over and smothered in the mud, but the attitude of the native mind, unspoken or expressed, was not of pity but of indifference, except that the victim was "fortunate to have died in the holy river."

A Mohammedan servant whom we threatened with dismissal, simply bowed his head and said, "*Bot aha sahib*. Allah has another place for me."

The languages at times give glimpses of the varying view-points of the native mind. In a certain dialect the word for "yesterday" and that for "to-morrow" is the same. Quite irreconcilable to the Western mind until one gets down to the subtle explanation that the word used literally stands for "the day the other side of to-day"!

I cite these examples to show how native thought moves along quite different lines from those of the European.

It is this public which contributes so largely to the 1,050,000,000 postal articles dealt with by the Post Office, which latter institution pays out over its counters to this same public more than 3,000,000 rupees in Native Military pensions, and takes care of something like 230,000,000 rupees of native savings.

Last year the combined departments posted or telegraphed native cash from end to end of India by means of 30,000,000 money orders, and by the aid of the value-payable post the Postal side collected no less a sum than R. 33,000,000 for the tradesmen of Calcutta alone, by delivering over 2½ million parcels by their excellent cash on delivery system.*

This should gladden the heart of that arch-socialist who recently suggested in an article entitled "The Red Milkman," that the British Post Office should undertake the delivery of the morning milk in London!

But the Indian Post Office does more. It provides letter writers in the chief post and telegraph offices for those of the public who need this assistance; it also collects the salt tax, and acts as local chemist, for it sells the essential quinine in many an out of the way village where chemists are not and doctors are rare.

Out in the Bay of Bengal 80 miles from the actual mouth of the Hoogley, the pilot meets the steamer and on the way in through the ever-changing shoals and channels the vessel passes signal stations such as that in Fig. 1, having days before picked up the signals from Elephant Point, where in 1904 the first Indian wireless installation was fitted.

A similar installation was, however, completely wrecked one night in a terrific hurricane which broke the mast off short near the ground, tore up the iron stays and flung the tackle into the sea. Not a vestige was ever seen again.

Calcutta I recall as the city of my first official acquaintance with the land of the Hindoo.

The old Calcutta Central Telegraph Office (a new one has quite recently been built and opened) stood at the corner of Old Court House Street and Dalhousie Square and within a very few paces of the historic Black Hole of Calcutta, still held by some of the natives to be inhabited by the souls of the white men and women who died there. Somewhat closer to the river is the Post Office, as distinct from the Telegraph Office, and certainly a more imposing building. It does not, however, make for public convenience to be compelled to buy postage stamps at one office and telegraph stamps at another across the road. The separation of the Postal and Telegraph Departments was at one time so complete that in some instances the offices were built at opposite ends of the town and the purchase of the two descriptions of stamps frequently involved a very considerable journey.

However, in the larger cities there was a number of "combined" offices where, so far as telegraphy was concerned, efficiency was certainly sacrificed to the convenience of having the two Services under one control, this control being invariably Postal, the signallers being on the Postal staff and debited, so I was given to understand, to the Telegraph account.

Strange to say the Telegraph Department had no power to criticise the efficiency of these "combined" operators. The signallers in question were of a decidedly inferior type to those provided by the Telegraph side, and appeared to be drawn from the half-educated Babu, whose standard may be judged by the following typical application for employment:—

* The report for the Indian official year 1914-15 was not available when this paper was read. It has since come to hand and war conditions even considered, it is eminently satisfactory.—J. J. T.

"Honourable Worthy and Noble Sir—I beg apology for intrusion in valuable precious moments and request you to endure a little *patients* in reading following fully *soliloquy*. I am much liked for acrimonious and prompt way I execute work. Being much disheartened of my sterile labour took into my head that some trade is superior to Clerk. Have been employed in almost all the printing offices and done bumper work of municipality. Have had great responsible business to keep my books up to mark, give daily account of weighment of stores and other sickening works."

My own experience may have been unfortunate, but I cannot recall one of these "combined" offices which had much pretension to cleanliness, or smartness, while the quality of the manipulation was rarely much above

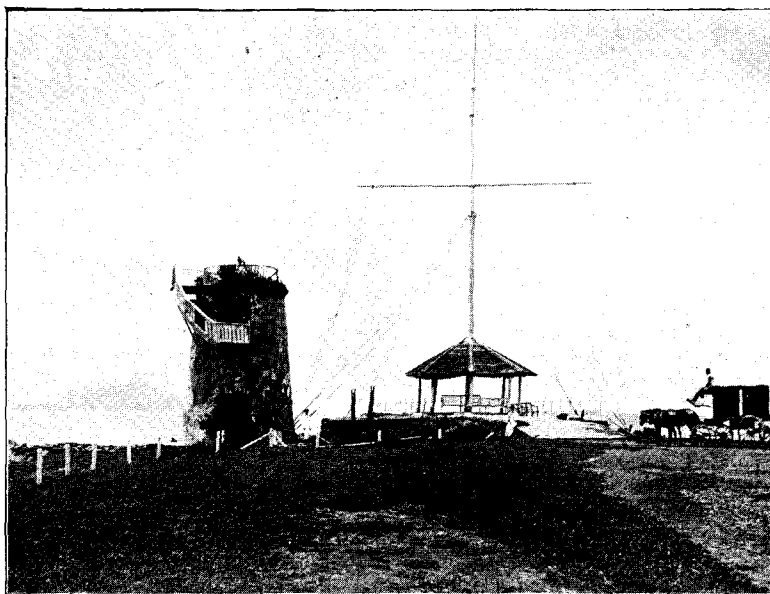


FIG. 1.—SIGNALLING STATION. BAY OF BENGAL.

the worst of the Indian Railways signallers. These latter seemed to think that any number of dots over four should represent the figure "five" with the rest of the numerals and the letters of the alphabet proportionately distorted.

It was decidedly a cheap system, but it was none the less as decidedly a nasty one.

There was a reciprocity between the two Departments as regards certain concessions to the Telegraph Service in the direction of the free despatch of small parcels by the Postal side in return for a free Telegraph service in favour of the Postal Department. This worked fairly well, although I heard complaints from the Telegraph side that the Postal authorities had the best of the bargain.

Within the last two years steps have been taken to amalgamate the Postal and Telegraph Services, and considerable headway has been made with a view to the co-ordination and closer co-operation of the Post Office and Telegraph Departments. On February of last year the Secretary of State for India communicated his approval to the two Departments to take effect from April 1, 1914.

In front of Dalhousie Square and jutting out from the first floor of the old C.T.O., a bunch of unsightly wires formerly stretched across the beautiful gardens and marred the view. I think it was the first attempt at putting wires underground in Calcutta when this section was transferred underneath the Square, but which proved a lamentable failure owing to the nature of the soil upon which Calcutta stands. The sub-soil is mostly mud and sand, such as has been brought down the Hoogley for ages, and in the rainy season many parts of the city are frequently under water. These difficulties may have been overcome by now by special underground construction. It was a serious disappointment to the engineers at the time.

The Calcutta equivalent of the Holloway Post Office and the Birmingham depots is situated some distance further down the river, cover scores of acres, and is conveniently built on the banks of what is known as Tolley's Nullah. This inlet of the Hoogley affords ready communication with the river and a facile means of transit between the stores and the steamers which are anchored out in the stream or close by in the docks. The "Yard" is apparently able to turn out complete telegraph and telephone equipment; from a Morse key to a Wheatstone receiver and from a telephone receiver to an iron telegraph pole. All the labour is of course native and comprises all types of workmen.

There are the bare-footed, scantily clothed coolies who earn their few annas per day at one end of the scale, and in contrast the Babu clerks and draughtsmen who count their monthly salaries in tens of rupees at the other, well clad, rarely seen without an umbrella, and generally shod with the latest American brown boot. In between these types of skilled and unskilled, range a variety of race and creed and competence.

Standing out among these are the industrious Chinese carpenters, splendidly patient workmen, but painfully punctual, never late in commencing

their tasks but obstinately refusing to knock another nail once the hooter has sounded their release. From the carpenter's shop we may pass into the foundry where labourers, naked save for a strip of loin cloth, walk without flinching across the burning floor, which, with its only half dead cinders feels uncomfortably hot even to our well-protected feet, seemingly quite heedless of the splashes of molten iron from the cauldron they carry swung between them.

Outside, other coolies are flinging sections of iron poles into the galvanising tanks, adroitly dodging the dangerous splashes of the liquid; other bare-footed ones are employed in tarring and painting sheds, &c., feet as well as hands being covered in the process. Much of the painting is done with rag instead of brushes, the native steeping the former in the paint and applying the latter as one would soft soap.

In the machine shops by the aid of the most modern plant other types are engaged in the making of screws, nuts and bolts, while some are occupied with the simpler forms of "assembling"; meanwhile lacquering, polishing and general finishing processes are proceeding in a similar range of buildings not far away.

Strange contrasts to the din of modern machinery and the hundred and one processes associated with modern factory life is the tin-wallah, or native tinker, who squats on the ground, heats his ancient soldering-iron by blowing the embers of his primitive charcoal fire by means of a goat-skin bellows, and in his own way, and at his own pace, quietly commences his work.

It is a noteworthy fact, and typical of British rule and system, that so solicitous is the British Government for the respect of the religions of the natives, that Alipore Store Yard is provided with a list of somewhere about 200 separate days upon which one or other of the Hindoo, Mohammedan, Chinese and other religions have duly recognised feasts or fasts. Upon such occasions as the feast of Bairam or the Moharran for the Mohammedans, the coming of age of the goddess of Kali for the Hindoo, the New Year for the Chinese, &c., &c., the followers of these persuasions may claim one or more days of release, according to custom. I was given to understand that the actual number of natives on the books of the "Yard" is maintained at considerably above the working needs in order to meet these peculiar circumstances and to maintain a steady output. Now and again a too wily employee is detected in having days off for both Mohammedan and Hindoo festivals, but these attempts are exceptional. The defence in one case was that the culprit had forgotten which religion he followed, a lie so obvious as to deceive no one.

The whole of the supervision of the store yard is performed by Europeans and Anglo-Indians. Western supervision would appear to be an absolute necessity if India is to be kept somewhere near the mark of moderate Western standards and is to be saved from itself. Never, I should estimate, was there a land where the danger of reversion to type was more imminent from day to day.

The more scientific portions of the work, testing, organising, estimating, calculating, designing and plan-drawing, are also carried out at Alipore, the printing forms a special branch at Simla. A view of the Cable Testing House, Alipore, is shown in Fig. 2, together with the staff then engaged in

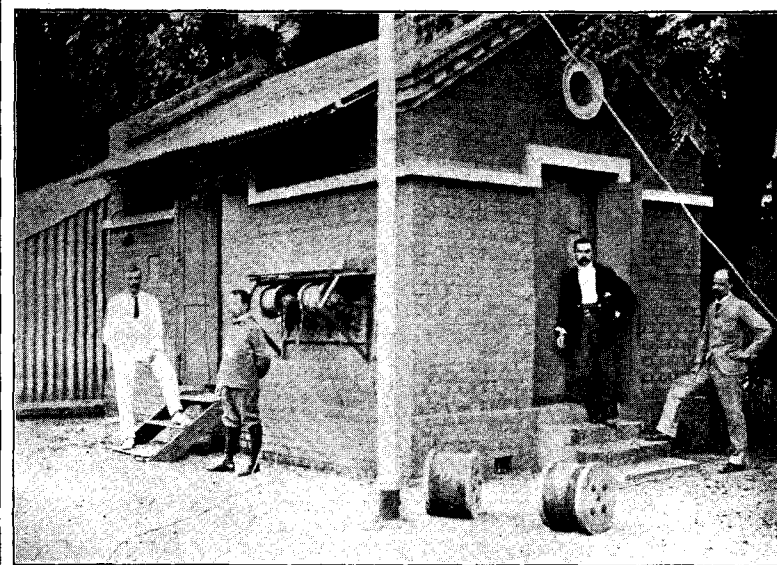


FIG. 2.—CABLE HOUSE, ELECTRICIANS' OFFICE, ALIPORE.

proving the cable lengths for one of our little Frontier campaigns, in this case the Sikkim Thibet Mission.

Mr. Simpson, the chief electrician, who is not unknown to the telegraph engineers of this country was at that time in full charge, and thanks to his personal interest a very convenient room was allotted to our use, where we were able to set up the whole of the apparatus, prove it, and at the same time give a practical exhibition of the working, fitting up two model terminal offices, and joining up two artificial lines through a special form of Baudot repeater as used by the French Government.

The advantage of this plan was two-fold, and the reasons for adopting this method, which at first may savour of unnecessary delay—may possibly prove of assistance to others of our craft who may have to carry out similar missions. In the first place, the apparatus reached India some months prior to our arrival and had been stored under a corrugated iron shed beneath the blazing sun of an Indian summer, the straw packing of one or two cases had sweated and it therefore became advisable to overhaul about twenty large cases of apparatus, some portions of which had to be taken to pieces to the last screw, before they could be despatched up country where repairs and overhauls of a new type of apparatus could not so easily be made.

Secondly, it proved of distinct advantage to have a bird's-eye view,

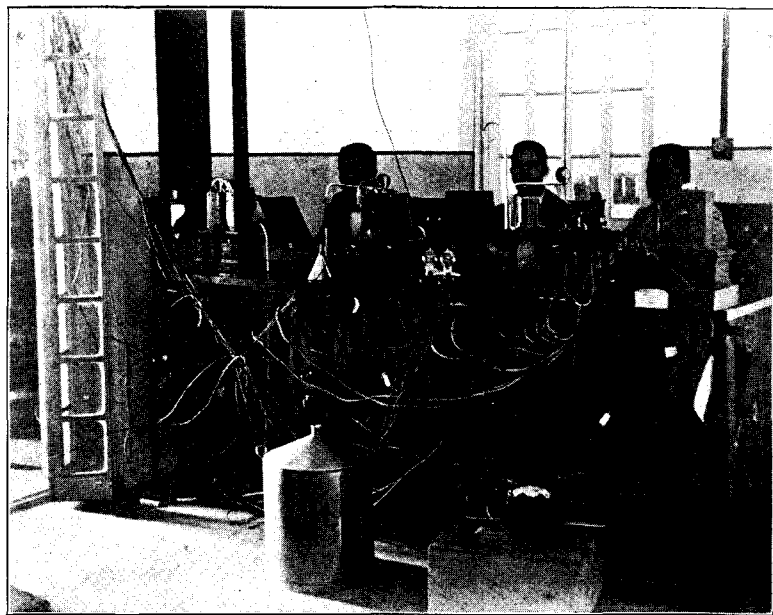


FIG. 3.—EXPERIMENTAL BAUDOT SET as fitted at Alipore prior to transfer up country. The first three Anglo-Indian signallers to learn Baudot manipulation.

as it were, of the three complete sets which were eventually to work in unison over a distance of 1,300 miles, thus placed compactly in this small workshop, where engineers, telegraph-masters and signallers could study the new system in its completeness.

About a month was thus spent, no time being lost meanwhile in teaching the manipulation to an apt and willing staff of Anglo-Indian operators. When all the apparatus, six complete sets, had been proved in turn, one set was permanently placed in the Calcutta office and worked for a day or two over the short line to Alipore, the Alipore set then being carefully repacked and consigned 500 miles up country to Allahabad. These cases were despatched about a fortnight before Christmas by "express goods" and marked "With care," although probably not one of the coolies who handled the packages understood the meaning of the words. Anyway we had time enough to have our Yuletide luncheon under the famous banyan tree in Calcutta and to reach our next destination a full week before the "express goods" arrived.

At the period when our little mission visited India, the Baudot system had not then received the full attention of the authorities in England, which has since been accorded to this and to other type printing telegraph systems, and as this one was pre-eminently a French system, and up to that time had been used exclusively on the Anglo-French cables, all the various parts were known by their French names. One of the incidental tasks was the translation of the names of the various parts of the apparatus, screws, levers, pins, armatures, and what not into the English language.

It was an educative and interesting task, but certainly proved the weakness of one's technical vocabulary in two languages.

Despite the introduction by the Director-General, there was considerable opposition to overcome before a type-printing telegraph system was allowed to settle down.

There were the usual opponents of all things new, and of those who saw the end of all things telegraphic in the new system. There was the usual opposition from the section which thought sounder reading would be impossible in its proximity, and to mollify these a corner apart was selected. Then someone objected to holes being cut in the flooring. This being settled we were up against the horrible possibilities which others saw in the delivery of the original printed slip to the public, while the department only retained a skeleton copy or a counterfoil. Frauds and complaints galore were predicted, this section of the opposition proving the most difficult to convince. Suggestions were made to overcome these objections, and to a trial of each of which we readily acceded. Thus it was argued that the original printed slip should be retained by the department but that pencil copies should be written out and delivered to the public! Against this we had to set our faces like steel, as it savoured too much of the Suez Canal native excavators who,

when provided by Lesseps with wheel-barrows filled them up and carried barrow and sand on their heads.

The suggestion was then made to use copying ink on the receiver ink rollers, and then to make copies of the gummed-up slip by means of damp tissue paper and a copying press, drying the copies on a string stretched across the office. We agreed to this trying experiment with a sigh, and spent half a day driving round Calcutta in search of a suitable ink. The experiment commenced but like Brer Rabbit we "said nuffin," and looked up. Presently someone felt too hot and started the huge electric fan overhead. This sucked up all the flimsy copies off the drying line, and of course when the fan was stopped they insisted on fluttering down into the wrong places with a cursedness born of inanimate things!

These experimental phases over we were the better able to request a trial of our own home system of dealing with printed telegrams, and as nothing very terrible happened, and despite the temporary opposition of one or two Babu check-clerks, those who came to scoff remained to bless, and so remain to this day.

But what wonder if the inventor and the innovating engineer have my deepest sympathy!

I should not advise too much reliance upon photos of any Eastern city to gain a true all-round impression. Photographs do not reproduce the miasmatic fogs which rise from the Calcutta Maidan, the plagues of green flies that render speech impossible in the open street, the streams of condensed water that pour off the inner walls like rain, the mildew which grows on one's boots in a single night or the various odours which float around.

Nor does the photographer faithfully depict the filth of a native street, with its millions of flies sucking at the native sweetmeat stall, they having just returned from a trip to the garbage of the gutter where a stray unkempt cow rests contentedly in its own mire. One must become used to the chewing native, who dearly loves his betel nut, and also dearly loves to squirt its repulsive red juice as he, happy enough, wends his onward way—but the camera says nothing of these!

The existence of standard time and sun time in India does not trouble one until one begins to use the railways, thus when it is 16 hours 50 sun time in Bombay, it is 17 hours 55 sun time in Calcutta, while Indian standard time is 17 hours 36. If then it takes 40 hours 59 minutes for the mail train to travel from Calcutta to Bombay, calculate what time the day after to-morrow you should be met at the west coast terminus if the mail leaves at 21 hours 20 to-day.

There is plenty of time to work out this and many other little puzzles on the way up to Allahabad from Calcutta, as the journey is of little interest telegraphically and generally monotonous. In this respect it is in marked contrast to the magnificent climb over the Western Ghats as one approaches Central India from Bombay side, especially if the journey be made at night and the moon be up.

The rise to Allahabad is only 300 feet in well over 500 miles, there are no tunnels, no exceptional curves and, save for the hedges of cacti specially grown as a protection against wandering live stock, nothing worthy of note, unless it be a series of stone telegraph poles, holes being cut through the top

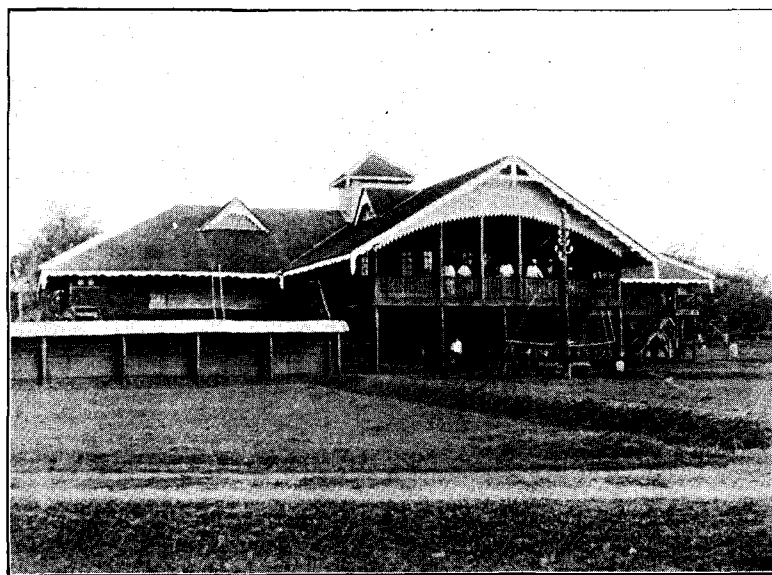


FIG. 4. TYPE OF TELEGRAPH OFFICE BUILT FOR RAINY DISTRICT

of these pillars through which the wires are passed. Ordinary wooden poles be it remembered are of little use in a land where the white ants will saw through an inch thick bookshelf in a single night.

I pause here while on our journey over the plains to note that if the native does not always conform to European methods, at least he has ingenious substitutes for reaching identical goals.

I was interested in a native schoolmaster in Madras, who, having no watch and wishing to send one of his scholars on a short errand, compelled the youngster to expectorate on the ground in the sun. If, on the boy's

return, the spittle had dried up, it was an indication that the messenger had been too long, and he was to be punished!

This is further evidenced in the use of primitive tools to which he clings tenaciously, of which here are two very fair samples in a Madras knife-grinder and the country water-lift. The native is perhaps most alive when bartering, whether as a gharri-wallah haggling over your fare, selling you Benares and other wares on the train, or more leisurely and more at home in city chowk under his own roof.

Here he delights himself with adopting what he understands to be an English name; thus, over the shop of a cloth merchant in Madras in bold characters one reads:

"God bless and Co.,
Merchant of Cloth."

While a Calcutta watchmaker rightfully described himself as a "Consoler of watches," and a barber advertises for sale:

"Hair producer for all kind
affections of the brain."

At Allahabad we again had to contend with objections to our innovations, which objections emanated generally from the very worthy but very nervous chief of that office, one particular grief being the fixing of the apparatus. Once convinced that we had full authority and that the office would not fall down if we had our own way, we were permitted to arrange for the cutting and plugging of sixteen holes about 2 inches square. This operation took about ten days, but fortunately did not delay progress all that time, and was something after the following order:—

A native stonemason arrived, took his measurements and cut the requisite holes; three days afterwards the carpenter cut the plugs; a day or two later the stonemason turned up again and fitted the plugs. Then our very own "mistry" started to complete the fixing of the tables to the floor, but after two days complained of pains in his "underneath," but thought he would recover if he could have a pair of the "bara-sahib's" boots! The bara-sahib, myself, thought otherwise, so our mistry kindly absented himself for 48 hours, returned as though nothing had happened, resumed the block-laying, assisted the stonemason, and the work was completed!

Here we had trouble with the ink supplied, owing in part to the climate. Someone thought we could make it locally, but after several hours spent in trying to manufacture our own lampblack by the aid of a beaten out kerosene tin and the vilest of kerosene lamps, it was decided as a cheaper and more rapid method to cable to England for a supply of the real article from Holloway.

It was at Allahabad that we had our first experience in teaching Baudot manipulation by means of metronomes, a method necessitated by the delay in erecting the real apparatus. This method proved very successful as a stop-gap, but needed the finishing touches of real keyboards and cadence.

The general staff of Allahabad was a very mixed one, comprising soldier signallers from home, Anglo-Indians, and native Hindus and Mahomedans. The signalling was equally varied but still well above the standard of the "combined" offices and the E.I.R. close by.

As in Calcutta the Baudot staff was selected exclusively from the Anglo-Indian signallers by request of the Administration. For my own part I should much like to have tried some of the higher types of natives as well, both here and at other offices.

It was not in the program to fit up anything other than a repeater at Allahabad, this city being halfway between Simla and Calcutta, but while waiting for material and having proved the apparatus, it turned out one morning that the wires were working very badly and having heavily delayed Press work waiting at Calcutta, we seized the opportunity and offered the services of the new printing telegraph. The copy was dealt with in double-quick time, neatly printed and without the caligraphic errors of which it appears repeated complaint had been made. This means of coping with the traffic was henceforward adopted until the day arrived for the opening of communication between Calcutta and Simla, when of course Allahabad reverted to its repeater function and the Calcutta-Allahabad news had to be dealt with by Morse. The Press, however, began to complain and wanted to know "why?" The end of it was that by means of a switching arrangement devised by one of our party the difficulty was overcome by Allahabad coming in circuit during Press hours, which period, by the happiest combination of circumstances, coincided with the slackest hours of the SM-CA traffic.

On one other occasion, and a less pleasant one, we were also but quite blamelessly mixed up with a Press affair, which, even up to the present moment, I have never been able to explain.

The authorities desired a semi-official article descriptive of the new apparatus to appear in the *Pioneer* now that complete success had been fully assured. One was drafted, set up and the proof passed by ourselves and the responsible engineer, but to our bewilderment on the very morning that this proof had been returned to the newspaper office in Allahabad a long, complete and detailed account appeared in a rival Calcutta daily, which "daily" had just had a little tiff with the governing powers. The appearance of this rival article was thus well timed, and forestalled that of the Government organ by 24 hours. There was naturally some official annoyance, and explanations were called for all round. Owing to the accuracy of detail of the rival account one had to admit the reasonableness of this demand. The Administration of course accepted our unqualified expressions of complete disassociation, but the affair was by no means a pleasant one.

Yet another incident which happened to myself while in this same city, and which will illustrate how departmental difficulties are at times overcome by the native. I was waiting patiently for certain instructions from Headquarters when one day I received a rather peremptory note as to why I had not replied to a former letter which, I may say, I had certainly not received.

Confident that nothing had reached me, after lodging the formal written complaint, I demanded an interview with the native postmaster. He, after salaaming most abjectly to my humble self, and kicking his poor old punkah wallah as a sign of authority (a privilege prohibited to the European), invited me to mount the rostrum of the office and seat myself in his own special armchair overlooking his staff. Here he listened to my complaint, remarked aloud on the competency of his subordinates, and swore how he would penalise the culprit, if such existed in his office, but assured me there must be some mistake and—bowed the "bara sahib" to the door. I wrote an explanation to the D.G. informing him of the steps taken and, with true Eastern philosophy—waited.

The very next morning what should I see on the middle of my blotting pad but the missing letter, then nearly a week old. Soon afterwards a sorrowful note came from the postmaster saying how much he regretted that although they had made further search nothing could be found. I was disconcerted, especially after the newspaper incident, and wondered whether my explanation would be accepted, but subsequently gathered that the matter was quite understood and that probably a peon, while I slept, had been deputed to slip through the bungalow curtains and deposit the missing document, which without doubt had been mislaid in the local P.O.

I do not know whether the arrangement has since been modified, but the process of despatching a telegram was formerly a lengthy one. It was the duty of the counter clerk to affix the stamps, and the customer had to wait while he did it. Having paid for your stamps, these were very deliberately and accurately pasted side by side across a distinctive black line specially printed across the form. The stamps, though already gummed, were affixed by the counter clerk placing his finger into a little pot of paste and smearing the backs of the stamps. The process of affixing being accomplished, a huge pair of scissors then completed his task by cutting the stamps and form in two across the black line, the top portion being given to the sender as a receipt for the telegram.

The cashing of money orders does not necessitate one's presence at the Post Office counter. The cash will be sent home. The Dak wallah comes to one's diggings with the bag of money over his shoulder, slips off his sandals, enters, bows low, submits the voucher, establishes your identity, squats down, empties the hundred or so silver rupees on the floor, piles them up in tens, counts and recounts, waits your good pleasure to check the same, takes your receipt, salaams once more and disappears as noiselessly as he came. Time taken 45 minutes for about 1,000 rupees!

I was informed that very rarely do cases of theft occur with these men, whose pay does not generally exceed 25 to 30 rupees per month, although sometimes the rural postmen decamps with the cash after cutting the postmaster's throat, and a few runners lose their lives each year. The financial guarantee they are compelled to give, coupled with a prospective pension, appears to be sufficient to ensure rectitude; these same officers would, however, have no compunction in going to sleep on a bag of undelivered letters by the wayside. One emptied his bag into the river because he was tired!

Great use is made of finger impressions in lieu of and in addition to the signatures of native customers at Post Office and Telegraph Office counters.

It struck one as curious to see a native savings' bank depositor take his withdrawal voucher out of his turban (substitute for the European pocket), place his thumb on the inking pad impress the voucher, and sign and receive the cash forthwith, but the native has become accustomed to this routine and appears to appreciate the system as far as he permits himself to express appreciation of anything, which is very very rare. The native temperament is rather to accept all, with a certain discrimination, European blessings, from telegraphs to kerosene tins and phonographs, as the will of the gods, and to make the best of them.

This he does, for he uses the telegraphs for betting on the jute sales or for arranging a marriage, manages to get the maximum amount of writing on a farthing postcard which will carry his news in three or four days from the North-Western frontier to Tuticorin or from Rangoon to Karachi, and will charge a pie or two to his next-door neighbour for the privilege of listening to a couple of gramophone tunes, while he mends the roof of his house with the remnants of a tin of water white!

Once things had dropped into working order there was not so much to do except to keep a vigilant eye on the standard of efficiency. This standard I have recently been given to understand has been well maintained from year to year, thanks probably to the "pie-money" or commission on work done.

Generally, however, as soon as one office became efficient we moved on to the next, in fact by extending our stay by about three months over contract time we managed to double the original program and leave suggestions for further developments. On one or two occasions, by request, we gave an eye to Wheatstone working, and were able to increase the speed on a main trans-Indian line 75 per cent. by simple readjustments of the relays. An engineer friend assured us it would not be maintained a week. Sure enough when we returned the speed had dropped back to its old figure.

After watching the Indian system of Wheatstone working we were not surprised. The telegrams were punched in batches of five, and we witnessed the following:—

Q to A.—Are you there A?

A to Q.—Yes, I am here.

Q to A.—I have traffic; may I go on?

A to Q.—Yes, please go on.

Q to A.—Here are five.

A to Q.—Did you send? I got nothing.

Q to A.—Yes, I sent five; here reversals.

A to Q.—Please reduce.

Q to A.—I have now reduced 10.

A to Q.—That is better now.

Q to A.—Here are five.

A to Q.—Please repeat second and fifth, and repeat name to of first, and so on.

Good Wheatstone work is done by the Government staff of course, as witness the "press" dealt with on mail day at Bombay, but the sample I have given is no exaggeration.

The indigenous races of India do not appear to have taken over kindly to the Wheatstone as a telegraph system, perhaps with some form of typewriter keyboard perforator they may find the process more compatible with climatic conditions.

This should especially prove to be the case now that typewriters are supplied to so many Indian Telegraph offices, and it is also possible that perforators of the Kotyra type would be looked upon with favour in preference to the more fatiguing "stick" punching.

In one or two offices where typewriters had been introduced for sounder work, it was however noticed that the telegram was taken down by sound in writing and then typed up whenever the T.M. was not looking! Both Baudot and Murray appear to have given satisfaction from an operator's point of view as well as from that of the supervision.



FIG. 5.—THE DAK-WALLAH.

The main trans-Indian telegraph routes generally follow the railway, but in parts the track has to be *made* as in some of the hill districts where, during the avalanche season the work of maintenance is carried on with considerable loss of life. This danger has been minimised in the case of the Burzil Pass on the road to Gilgit where, during the critical weeks, a bare uninsulated wire is laid on top of the mountain snow, and by which means communication is maintained with Srinagar.

As a contrast to this there are other portions in Far Eastern India where the same work of track-making is hampered, not by snow but by the luxurious growth which climbs poles at a tremendous rate and would soon clog the wires were not a clear path several feet wide maintained through these jungle districts.

This can only be done by daily and assiduous labour, for 24 hours' growth in the tropics means full contact on all wires in jungle districts.

In Assam, parts of which have a rainfall of 600 inches, the humidity of the atmosphere one can well understand touches the figure 100, and "full earths" are therefore frequent. On the western side of Calcutta the route

is sandy and dry in summer but well under water during the rainy season, so that in this district the poles have the appearance of forming part and parcel of the paddy fields and their growth.

Rivers shallow and but a few feet or so wide in the *dry* season spread out their surfaces till their banks are literally miles apart in the rainy season.

We were fortunate enough to be present during one of the holy bathing melas of the Ganges in the dry season. During this festival over a million pilgrims were computed to have visited the holy spot, which is actually an island formed by the conjunction of the two rivers.

Incidentally the most remarkable feature of this festival, the Kumb Mela, was the provision made for the welfare of the pilgrims by the British Government and the control of the enormous crowds practically by one white man and a few native police.

After leaving Umballa, 1,000 feet above sea-level, the ground begins to rise more sharply and the railway track begins to show a change into more rugged and stony ground until Kalka is reached at the foot of the Mashobra spur of the Himalayas, 2,000 feet above Calcutta level and over 1,100 miles distant.

Here one changes into the narrow, metre-wide hill railway which leads up to Simla. From Kalka the telegraph line is somewhat independent of the railway and appears to follow the Tonga or Post road, which like the rail follows a sinuous path up the remaining 5,000 odd feet to Simla station. The telegraph route has the advantage at times of being able to take short cuts *across* ravines rather than round them, the insulators being fixed to pines, deodars or other convenient trees which with their grip upon the otherwise precarious earth afford more stability than the very best timber pole, however well punned.

The railway route traverses no less a distance than 59½ miles in its climb of 5,000 feet, owing to the twists and turns rendered necessary by the gradient and the nature of the mountainous district. The building of the railway has necessitated the construction of a number of arched viaducts and no less than 104 tunnels, the longest of which is three-quarters of a mile. It is a single line with cross-overs at certain points and stations, but at places the ledge upon which the train travels is so narrow that looking out of window the footboard appears to be overhanging the precipice.

In the journey up, the change from the tropical through rain, sleet and snow clouds, until one reaches Simla town and finds the Town Hall with icicles 20 feet long hanging from the roof is truly remarkable. It should be mentioned that we first visited Simla some six or eight weeks before the opening of the actual season, and when although the shade temperature of the plains hovered round the three-figure mark, that of the hills more nearly touched the single figure. Later on the Simla temperature approximates to the conditions of a "good" English summer, while that of the plains creeps up to a shade reading of 130 to 140°.

Before entering the Simla district the train is stopped and the passengers are all subjected to a more or less rigid medical inspection, the natives being roped in round the railway carriages by native police during the process, the Europeans being visited in their compartments.

This ceremony over the last stage is entered upon by the train snorting its way under Summer Hill and the Vice Regal Lodge and out into the lower portion of Simla town.

It was not less remarkable that, despite the varying conditions through which the telegraph line had to pass, how comparatively free from faults the engineers managed to keep this hill section. The chief source of line troubles in this district both as regards telegraphs and the local telephone service of Simla appeared to be the monkeys who not infrequently utilised the network of wires as a free gymnasium.

It is not often, I presume, that officially, the telegraph engineer in England comes up against a religious difficulty, but the monkey trouble in this district is primarily a religious matter. The monkey is sacred, and must not be slaughtered or unduly interfered with, no! not though the telegraphs and telephones suffer, not though these pre-Adamites climb in at one's bedroom window, eat the soap and upset one's best bottle of bay rum. You may frighten them away but you must not hurt them, and a heavy fine can be imposed for any breach of this regulation.

Higher up the hill side at a spot called Jakko is a small monkey temple, and here a fakir dwells throughout the whole of the year and waits upon the Simian tribes. For a few pice he will bring these creatures cut from the forest, including the monkey king, all hurrying across and down the pine trees at his peculiar call.

The railway route was laid down in 1900, but for nearly ten years the Simla cart road was used for the carriage of the mails, the horse-drawn tonga frequently beating the train for speed. Only two horses were used at a time, and these were changed every five miles. Finally the little Scotch-built engines obtained the mastery and the road route for mails is now I believe abandoned. Nevertheless, for dashing horsemanship and thrilling effect, let me recommend a sight of these native drivers and their rocking tongas as they twist round dangerous corners at break-neck speed, heedless of the chasms within a foot or two of their wheels.

We had little or no difficulty at this office so far as the installation was concerned, and were soon working right through to Calcutta. The first day's successful run was made under the following varying meteorological conditions. At snow-clad Simla we were using Alpenstocks and snowshoes, at Allahabad there was a shade temperature of 110°, and at Calcutta a tropical thunderstorm was raging with a couple of feet of water in some of the streets. Of course, it became much warmer all the way round in a week or two from this time forward.

Here at Simla one comes into contact with other types of native, and of most special interest were the Thibetan labourers who work two on a shovel and are shown here excavating the hillside not far from the post office.

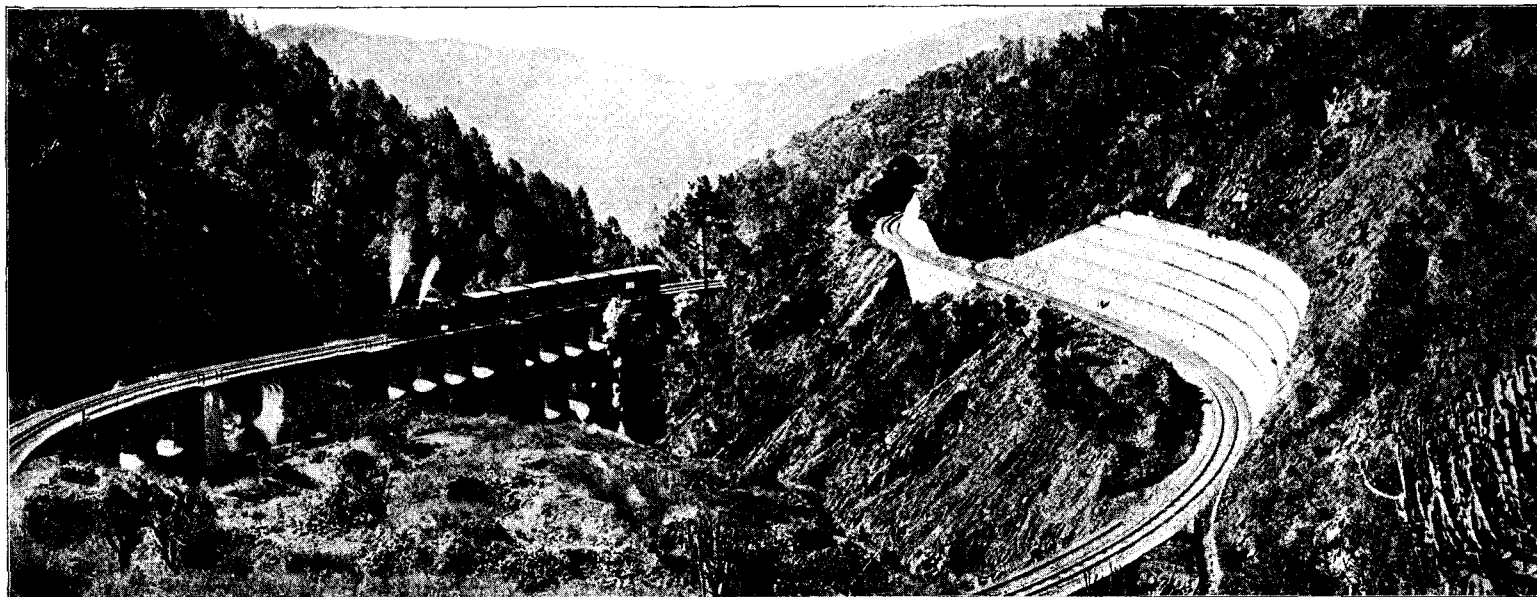


FIG. 6.—ONE OF THE LOOPS ON THE KALKA-SIMLA RAILWAY.

Earthquake shocks are not unknown, and one we experienced tumbled us out of bed in the early hours of the morning, splitting our bedroom wall, and killing two natives in the valley below. I have not yet decided in my own mind whether this experience or Zeps. over the office is to be preferred. I do know that for several nights afterwards we frequently woke at the sound of the "kud" as it broke away from the hillside and struck against the sides of our house, only to find that a band of howling jackals had loosened the earth as they slouched along the path just above.

The complete success of Baudot working between Simla and Calcutta with Allahabad as a repeater office, was followed by further experiments on this same route, so that by using a conductor of 200 or 300 lbs. copper plus about 100 miles of 600 lbs. iron conductor, the latter in the Himalaya section, quite excellent results were obtained by direct Baudot working over 1,300 miles of open wire without an intermediate repeater and with a voltage of 100.

Leaving this circuit in full swing we were next requested to turn our attention to the Calcutta-Madras section, a line of about 1,000 miles skirting the eastern coast.

By this time there was very little opposition to or criticism of the system, and the installations at Madras were quickly installed. One of these we utilised for the Madras-Calcutta circuit, which worked direct, as also did the second circuit which served the Madras-Bombay line of about 700 miles and dealt with what is known as the "foreign" traffic, *i.e.*, the traffic between Europe and the Far East, which was handed by the Eastern Company to the Indian Government at Bombay, or by the Indo Company at Karachi, then transmitted from Bombay to Madras, at which latter point and in the same building it was handed over to the Eastern Extension Company for transmission to Penang and onward.

Thanks to the courtesy of the then manager of the latter company we were able to make a lengthy visit to the cable office and operating room and to watch the working of the Madras-Penang submarine cable.

The most recent Annual Report of the Posts and Telegraphs of India notes the laying of a new Aden-Colombo-Penang cable, the effect of which has been to divert much of this traffic from the trans-Indian route to that *via* Colombo.

The peculiar feature of this special traffic rests in the fact that the main flow is from east to west during the daytime, and from west to east during the night. There is thus constant pressure in one direction or the other, but not always in both. Whenever the pressure was consistently heavy in one or other direction, the adaptability of the Baudot was found of special utility, as it could be worked duplex, both channels being used in whichever direction happened to be most needed.

There is, as yet, nothing approaching our home "underground" construction in India, and it is questionable whether, considering the immense distances to be covered and the sparse populations in between the larger cities, such an underground system would pay. Considering the many physical difficulties, the maintenance of the main Indian lines leaves very little to be desired. The route from Calcutta to Madras constructed on iron poles, for mile upon mile, skirts the coast through swampy frog-haunted lagoons where the monsoon winds drive the wet salt sand into the insulators and wires, thus setting up local action and resultant stray currents of easily measurable value; nevertheless, they were workable with Baudot double even when Morse duplex failed. Improved maintenance has done much, no doubt, as recent official reports intimate that the Baudot duplex has been successfully worked on this route as also between Madras and Bombay. The report does not, however, say whether duplex was maintained throughout the rainy season.

While at Madras, for several days we had considerable intermittent line trouble on this very route to Calcutta, which trouble was always located fairly close up to the office. Of this we were convinced, although the T.T.M. could not be prevailed upon to admit as much and maintained that the lineman had cleared all faults. We determined upon a little amateur lineman work ourselves, and were rewarded by discovering at a pole close to the shore of the all but tideless sea, a large crow's nest, built up against the insulators and on the beach a broken spring mattress. The connexion between the crow's nest and our intermittent fault was simply this, that a pair of these iron beaked carrion birds had woven odd pieces of the broken springs into their aerial home—a light breeze did the rest.

The lot of the Telegraph Testing Master in an Indian telegraph office is not an enviable one. In many of the telegraph offices the T.T.M. is expected to be on duty throughout the 24 hours. He is responsible for the maintenance of the lines, the apparatus, the batteries and, where one is installed, the electric light system, which latter includes the gas or oil engines for driving the dynamos. To reach this responsible position he is compelled to pass a fairly stiff examination, but owing to the absence of facilities for obtaining practical knowledge such as that afforded by our technical institutes in England, the product of this system is not always a success. We found that in some cases though well versed in theory and saturated in the higher mathematics, "buckled plates," "over-worn bearings," and defective commutators were left to reveal their weaknesses in a breakdown, instead of being remedied beforehand.

Let it not be said that I have made no reference to the telephones of India. It is with no sense of satisfaction that one is compelled to state that there does not appear to be any general alacrity on the part of the native to adopt this invention. True, an automatic exchange of 700 lines has been recently opened in Simla and given every satisfaction, a central battery exchange for 600 lines at Delhi, and one of 200 at Raisena, the latter is the site of the Imperial city, but these three towns are no criterion as they have a considerable official and white population, and the number of native subscribers is not likely to be large. That the telephone has not up to the present become popular with the native may best be judged from the fact that the total number of Government telephone operators for the whole of India only reached the modest figure of 145 in the official year 1913-14. *Doubtless when the right note is discovered, the telephones will forge ahead, but as in the case of the railways it will probably not be a Western view which will move matters. Similarly with the employment of women in the Indian Post Offices. The position of women among the native races, except perhaps the Parsees, who are not indigenous to the soil, is such as to prohibit their employment in anything beyond manual labour or domestic assistance, as in the case of the ayahs. A few Anglo-Indian women are actually employed by the Telegraph Department, but their number is negligible compared with the numbers of the male staff, *viz.*, 80 women to 12,000 men.

During these last nine years, Baudot working has been rapidly developed throughout the Indian Peninsula and into Burma. The moderate prophesy and program of Mr. C. T. Williams, the superintending engineer, which appeared in the *Electrician* of March 22, 1907, has thus been fully realised and even further developed. As already mentioned, duplex Baudot has been established between Madras and Calcutta. It has also been successfully worked between Madras and Colombo, and between Madras and Bombay.

* Now increased to 162, *vide* 1914-15 report, which also states that trunk lines for Government use only were installed in November of last year measure 210 miles in length and are used in connexion with Government needs at Delhi and Simla.—J. J. T.

Gell Telegraphic Appliances Syndicate, Limited.

ON WAR OFFICE, ADMIRALTY, POST OFFICE, CROWN AGENTS, AND OTHER COLONIAL ADMINISTRATIONS
LISTS OF CONTRACTORS.

SOLE MANUFACTURERS OF THE

GELL KEYBOARD PERFORATOR.

GELL Motor - Driven Transmitter.

GELL Motor - Driven Receiver

for Morse and Cable Wheatstone working.

Also Manufacturers of

**LANDLINE, CABLE AND WIRELESS
TELEGRAPHIC APPARATUS.**

Registered Offices:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Sardinia House, Sardinia Street, Kingsway, W.C.
Telephone: Holborn 6826.

Works:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Pine Grove Works, Tollington Park, London, N.
Telephone: North 1196. Telegrams: "Gellitas, London."

Switchboards and the Central Office.

By A. V. ABBOTT.

271 pages. 5 × 8. 169 illustrations.

Price 6/3 net.

Sent post paid to any part of the World.

This is Volume 6 of the Author's complete work "Telephony."

CHAPTER I.—Introduction. II.—Distributing Boards. III.—Circuits and Apparatus for Small Switchboards. IV.—Transfer System and the Multiple Boards. V.—Common Battery Circuits. VI.—Toll Line Circuits. VII.—The Power Plant. VIII.—Traffic.

Storage Battery Engineering.

By LAMAR LYNDON.

601 pages. 6 × 9. 298 illustrations. 48 chapters.

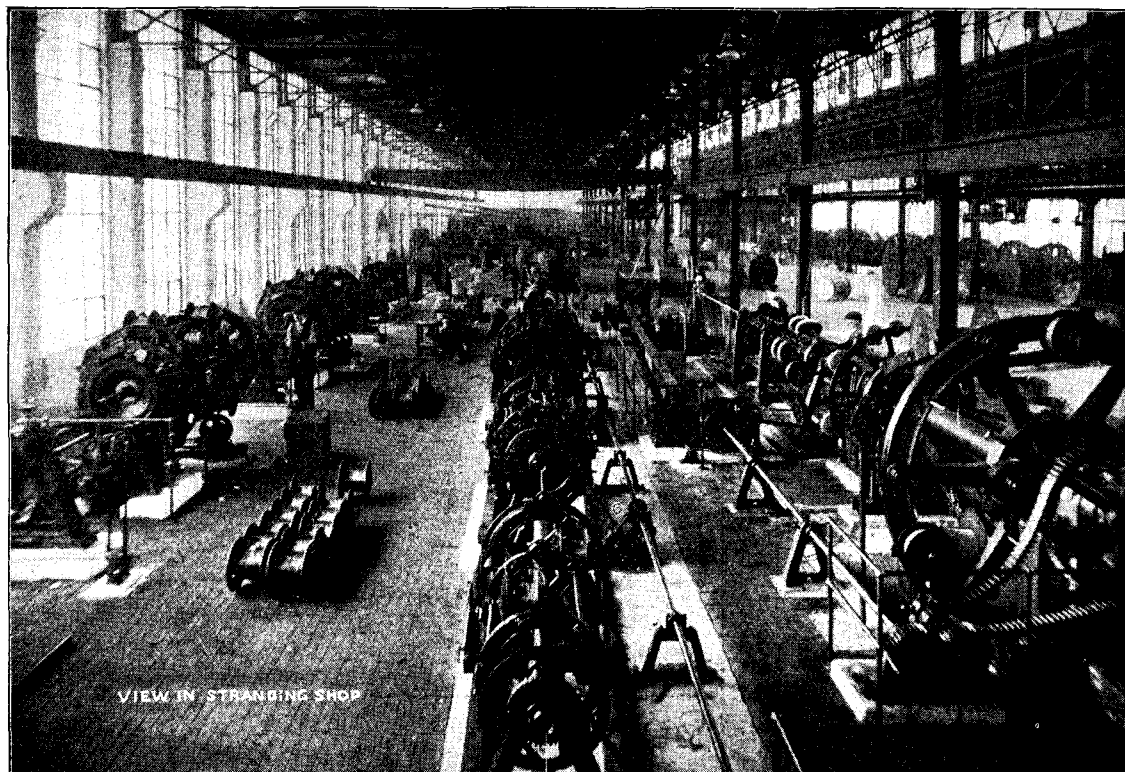
Price 17/- net.

"Every Telephone Engineer will find this volume useful."

CATALOGUE TT WILL INTEREST YOU.

HILL PUBLISHING CO. LTD.

6 & 8, BOUVERIE STREET, LONDON, E.C.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

Do you realise that if it were not for the British Fleet you would now be searching the gutters for bread?

This is the plain, unvarnished truth. We should literally be starved out in three months but for the Navy! Yet what do YOU know about its ships? What do YOU know of the men who built it up, of its development from the wooden walls of old to its constitution to-day? You cannot appreciate the Navy as you ought unless you understand it.

THE BRITISH BATTLE FLEET

ITS INCEPTION AND GROWTH THROUGHOUT THE CENTURIES TO THE PRESENT DAY

By FRED T. JANE,

Author of "Fighting Ships," "Heresies of Sea Power," &c., &c.

WITH

Twenty-five Illustrations in Colour from Water Colour Drawings

By W. L. WYLLIE, R.A.,

and numerous Plans, Maps, and Photographs. &c.

THE ACCOMPLISHED AUTHOR.

It is the work of a man who writes out of the fulness of knowledge that comes from a lifetime study. An author who writes in such a way as to render a subject, bristling with technicalities, as clear as noonday to all.

This book is no mere catalogue of fighting ships, but the only genuine

HISTORY OF THE NAVY.

It treats of types and designers of those types, takes account of every genuine improvement in "effectiveness" from the days of the "Great Harry," commissioned by Henry VII. (the first British ship designed and used exclusively for war), down to the largest and latest of our super-dreadnoughts, "The Queen Elizabeth."

It gives an authentic account of the important new arms

THE SUBMARINE AND THE WATERPLANE.

Mr. Jane graphically describes both the uses and the limitations of these remarkable engines of war.

In short, this is probably the most vital book of the day, for it makes plain to all the great

task with which our men and our Fleet is entrusted.

SPECIAL VALUE TO MUNITION WORKERS AND INVENTORS.

New inventions were never in such demand. The Admiralty and the Munition Department have both set up influential Boards of Distinguished Men specially to examine all ideas submitted, *but these ideas must be practical.* Read "The British Battle Fleet" to understand what is wanted by the Navy.

YOUR SONS IN THE NAVY WILL WANT IT.

They will revel in this book if you send it to them, or keep it until they return to civil life. They know it is written by an able man well qualified to write what is undoubtedly the best account of the Navy, its present purpose and past achievements.

"THE REFEREE" says:—

"The author has 'done his bit' to turn our rule-of-thumb nation into a scientific nation by explaining how the wheels go round. . . . *In these days such a book as this is priceless.*"

ILLUSTRATED CONSPECTUS FREE.

Containing Coloured and Black and White Prints of Famous Ships together with full details showing how the work can be purchased by all without strain upon the pocket.

Please send Form or a postcard mentioning *The Post Office Telephone and Telegraph Journal.*

The Library Press, Ltd., 5 & 6 Portugal Street Buildings, Portugal Street, London, W.C.

Please send me the Illustrated Conspectus of "The British Battle Fleet." This request does not in any way imply that I will purchase the book.

Name

Address.....

Just Published. With 170 Illustrations, 12/6 net.

The Telephone and Telephone Exchanges

THEIR INVENTION AND DEVELOPMENT.

By J. E. KINGSBURY, M.I.E.E.

AN attempt has been made in this work so to relate the inventions and developments in the telephone field that the record may constitute in effect a short history of the telephone industry and an exposition of its main principles.

The principal inventions have been selected. The circumstances leading up to them, and the developments resulting from them, and the influences bearing on them, have been considered with all the detail that space permits. But telephone exchange service is not merely a matter of plant and invention. Technical, commercial, and political threads compose the fabric, and they are interwoven in the record. The recital of the prior causes has served in most cases to make clear the technical features.

PROSPECTUS SENT ON APPLICATION.

LONGMANS, GREEN & CO. 39, Paternoster Row LONDON. E.C.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital).

Telephone: 1309 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6 in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3S. 6D. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

Spectacles or Pince-nez in steel or solid nickel frames, with sphere	PER PAIR
or compound Lenses	s. d.
	3 6
Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames	
	7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE. WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

With regard to the last-named city, the 1913-14 report of the Director General states that: "The Baudot apparatus proved most useful in the rapid disposal of traffic on busy circuits. . . . In the Bombay Telegraph Office alone 2,577,887 telegrams were disposed of in twelve months by Baudot apparatus, or one-third of the total traffic of the office."

Whatever may be said as regards the initial criticisms of the Baudot system, by Indian officials—and no good system need fear, and every system must expect the fire of critical examination—this much must be placed on record. Once convinced that "they were on a good thing," no time was lost by the India Office and no expense spared to push it.

It was pointed out to those then in authority that it paid to look after the apparatus well, and paid to have expert officers both in charge and as operators. It was proved that the apparatus would stand all the variations in climate, including a sand-storm or two, and one is almost glad to see that the Indian Government have outpaced the Home Government in the race by encouraging proficiency in the use and care of Baudot apparatus to the extent of granting money allowances to those who attain a certain standard—practically recognising the class of officer known as "dirigeur."

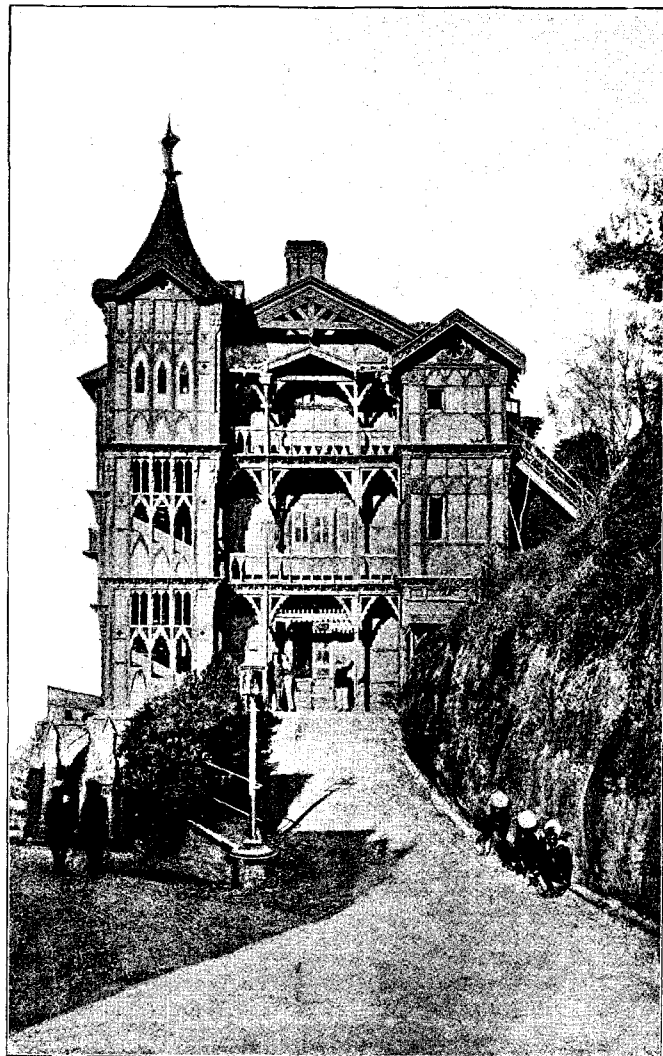


FIG. 7.—SIMLA TELEGRAPH OFFICE.

One has to admit that the conditions are not identical, but "out there" it is well understood that without the constant push and impetus of Western encouragement, everything has a tendency to revert and slacken. I do not know that we are altogether free from this complaint in this country and in the Telegraph Service.

The native, however, maintains that "time was made for man not man for time," and he tries to live up to it. One has unceasingly to cry "jaldi jaldi" without in any way wishing to overwork or overdrive.

The native and the mixed races are skilful enough, intelligent enough, and there are sufficient of them to do all the work that India needs to develop her resources to the full. We had a "mistry" at Madras, who successfully repaired a watch which gave the changing dates and phases of the moon, and who had equipped himself with some of the latest tools which Clerkenwell could supply.

One could converse with other natives on every branch of British literature, and especially was this the case in Southern India, but over all and though it all is the lack of that gift of the power of "keeping on,"

Through the whole of this medley of races seems to run the influence of Kismet. A stone falls from a portico which should long ago have been repaired, it is fate: the sand silts up in the harbour mouth, "Kismet" again, but only the Westerner suggests action; plague breaks out, it is the British authorities who segregate the people and reduce the disease: black fever rages as in Madras, "the will of the gods" says the populace, but it is the officials from the West who trace back the germs to their source and find that the dhobis have been washing their clothes in the city's aqueduct!

There are exceptions of course, but they only prove the rule. India provides so great a range of race and intelligence that generalisations are difficult without injustice to someone, somewhere.

During a comparatively brief stay, I managed to get into touch with all sorts and conditions of men, from priest to peasant, and in my spare hours visited workshops, factories, printing works, hospitals, police station, stores, and also native and British taught schools, spending not a little time in the native quarters, simply because I wanted to understand the native mind and habit of thought.

Of course, I never but very partially succeeded. There is, however, something alluring, if perplexingly so, in the land and its people.

This allurements increases once one has taken a living interest in the country. Whether it be the special interest of the Post Office and its Telegraph system which together come into so frequent and personal a touch with the people, I cannot say, but certain it is that often and often since returning to England, I have realised the full meaning of that single line which the poet wrote,

"I can hear the East a-calling!"

for the Eastward allure comes back with a persistence and subtlety which is one of the mysteries of a mysterious land.

I am afraid I have only succeeded in reading a few scattered reminiscences and very little really useful information concerning the Indian Telegraphs, but as you have been patient enough to listen, I dare to hope that I have not wearied you overmuch.

LONDON TELEPHONE SERVICE NOTES.

It seems difficult to believe that we are at the end of 1915 and that these lines will not be read until the beginning of a New Year (if indeed they be read then); yet so it is, and we cannot better commence the L.T.S. Notes for January than by recording our wish that 1916 may prove to all the members of that Service a year of health and prosperity. We look back over the closing year with pride in the part which our Service has played in the present World's War. The last issue of the JOURNAL contained an article by Miss Heap outlining some of the "war" activities of the women of that Service—and a noble record it was. Not only have our telephone women met fully and freely all those special demands made upon them in connexion with their daily work, but as was shown by Miss Heap they have devoted unstintingly their time and money to bring comfort and relief to those stricken in our wars. The men too can tell a tale of duty well done. By the middle of November close on 650 had quitted their civil activities to assume those of a military character. Of the men that remain, practically all who are within the limits of age have placed themselves absolutely at the disposal of the State and have been *attested*, and at least, so far as the Benedicts are concerned, their wives have spent the magic *two and ninepence*. How many of these "Derbyites" will, we wonder, be decked in khaki within the next few months. Those who have already left us and pay flying visits to the scene of earlier labours, all look benefited by the military life, albeit it is not without serious discomforts at times. We trust that those not required to operate the other end of the Anglo-German telephone cable may take up duty again in the L.T.S. before the end of 1916.

Since the December Notes went to press the telephone societies have been much in evidence. At the Telephone and Telegraph Society's meeting on Nov. 22 we were carried away to "India's coral stand" and given a peep at some of her people and their habits. Mr. Tyrrell seems to have a never-ending fund of anecdote, always interesting. The comments following his paper naturally partook of a "telegraphic" atmosphere, for the Government of India has not so far proved sufficiently enlightened to call for the assistance of telephone experts from England, but we can only hope that they will awake to their deficiencies before long. They might at least institute a phonogram service and ask for someone from the L.T.S. to demonstrate over there the various merits of London's ideal system.

However, the Telephone Service, possibly to show that its

members are not entirely untravelled, arranged a trip to "Constantinople," dealt with later. Well over 300 members of the London Telephonists' Society attended the November meeting for a debate on "The Ideal Telephonist—He, She or It." The supporter of the male claimant chose to base his case on the plea that writers, men and women of all ages, had asseverated that man possessed in a more marked degree than did woman those qualities which combine to make the ideal telephonist. Thus, if these authorities were to be accepted—courtesy, accuracy and speed, as well as other most desirable characteristics were to be found pre-eminently in the male sex. Miss Cannard's paper in support of the claim of the gentler sex showed that in practice at least the woman won on the quality of her voice and the dexterity of her fingers. "It" found a sturdy exponent who recited a list of the foibles of the fair telephonist. That the list was near the mark in most instances, if not all, was shown by the manner of its reception by the audience. The discussion was keen and general, but the honours of the evening went to Miss Cox, of the Trunk Exchange, who, in an extremely witty and happy speech, presented a realistic glimpse of the male telephonist *as he is*. The general opinion seemed to be that if a girl was not the ideal telephonist, she was the nearest approach thereto so far manifested. Perhaps in the next session it will be possible to have a discussion on the "Telephonists' Ideals—during office hours and out of them!"

The December meeting saw a packed house when Miss Minter gave an illustrated lecture on "Constantinople—its Peoples and its Telephones." Miss Minter was *charged* with her subject, and she kept the attention of the audience rivetted for more than two hours on her recital of the charms and excitements of life in that city which, perhaps of all cities, is most in men's minds at this time. Excellent slides had been prepared, in many instances from Miss Minter's own negatives, and one had no difficulty visualising and vivifying the scenes depicted. The time passed all too quickly, and it is greatly to be hoped that Miss Minter will be persuaded to give another lecture on this subject before she returns again to her Exchanges and their Managers. The attendance was little if any short of 400, and amongst others present, as well as Colonel Ogilvie, were a number of prominent members of the late National Telephone Company's service including Mr. Gill and Mr. C. B. Clay. Unfortunately Mr. T. Beck, the president of the society, has been prevented by military duties from attending either of the last two meetings. He is now with his regiment in Ireland.

The inaugural concert of the "L.T.S. Orchestra" is being held at the Cripplegate Institute on Saturday, Dec. 18, and it is hoped to give next month some account of this gathering. Colonel Ogilvie has accepted the presidency of this body, and its vice-presidents include the Controller and other chief officers of the London Telephone Service. The conductor is Mr. William C. White, of the Accounts branch.

The Croydon Telephonists' Society had another interesting meeting on Dec. 2, when Miss Nightingale, Chief Supervisor of the Greenwich Exchange, read a paper on the "Personal Factor in Telephone Work," and suggested that farming should be taken up by those telephonists who desire variety of occupation. Miss Nightingale succeeded in conducting to the contentment of her hearers in their daily work. She was followed by Miss A. E. Carpenter who discoursed of "War—the Telephone and the Telephonist." Her paper proved a most exhilarating account of a supervisor's answer to various calls for emergency duty in the face of Zeppelin raids, and we hope the paper may later appear in the pages of this journal.

PRESENTATION.

Mr. H. C. TOWNSEND, Exchange Manager, Hop Exchange, was the recipient of an oak presentation clock from the Traffic and Engineering staffs on the occasion of his marriage on Nov. 25, 1915. He was also presented with a silver and cut-glass *epergne* and a silver and rosewood biscuit barrel by the staffs of the Dalston and Walthamstow Exchanges respectively, with whom he was associated prior to being transferred to the Hop Exchange.

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

Transfers—

Miss E. A. CANNARD, Assistant Supervisor, Class II, has been transferred from Park to Kensington Exchange.

Miss K. HOOKER has been transferred from Avenue to Trunks. 1

Miss K. BRAIN has been transferred from Avenue to Wanstead Exchange.

Resignations—

Miss MAUDE JOHNSON, Assistant Supervisor, Class II, has resigned in view of her approaching marriage, and was presented by her colleagues at East Exchange with a tray and tray-cloth.

Miss M. T. HART, of Woodford Exchange, has resigned to be married, and was presented with a breakfast cruet.

Miss JESSIE NORTH, of Victoria Exchange, has resigned in view of her approaching marriage, and was presented by her colleagues with a silver-mounted china biscuit barrel and sugar dredger.

Miss HUMPHREY, of Victoria Exchange, has resigned.

Miss ROWLAND, of Victoria Exchange, has resigned.

Miss G. BROWN, of Victoria Exchange, has resigned.

Miss LILIAN C. TARRANT, of Hampstead Exchange, has resigned to be married, and was presented with a silver cake basket and other gifts.

Miss ETHEL COOK, of Hampstead Exchange, has resigned, and was presented with a silver cake basket and other gifts.

Miss HILDA R. OLLIVER, of Hampstead Exchange, has resigned and was presented with a set of books.

Miss GLADYS M. WOOTTON, of Hampstead, has resigned, and was presented with an ebony backed hair brush and mirror.

Miss DOROTHY F. CHURCH, of Hampstead, has been presented with a gold signet ring on the occasion of her retirement.

Miss ELLEN E. STONE, of Holborn Exchange, has resigned.

Miss EMILY V. MELLOR, of Holborn Exchange, has resigned.

Miss MINNIE A. PATERSON, of Holborn Exchange, has resigned.

Miss D. R. SIMS, of Holborn Exchange, has resigned in view of her approaching marriage, and was presented by the staff with a silver basket, a sweet stand and several other useful gifts.

Miss M. S. E. HURLIN, of Holborn Exchange, was presented on her retirement to be married with silver pepper and salt dredgers and other useful gifts.

Miss W. LLOYD JONES, of Avenue Exchange, has resigned.

Miss M. TILLEY, of Avenue Exchange, has resigned.

Miss D. BELITHER, of Avenue Exchange, has resigned.

Miss E. CAREY, of Avenue Exchange, has resigned on account of approaching marriage.

Miss D. PERKINS, of Avenue Exchange, has resigned in view of her approaching marriage.

Miss AGNES CAMPBELL, of Gerrard Exchange, has resigned to be married, and was presented with several useful gifts by the staff.

Miss LILY B. ROBINSON, of Stratford Exchange, has resigned in view of her approaching marriage, and was presented with a tea service and other gifts.

Miss M. T. HART, of Woodford Exchange, has resigned to be married.

Miss L. POWELL, of Paddington Exchange, has resigned, and was presented by her colleagues with a week-end case.

Miss ELLEN S. McKEON, of Battersea Exchange, has resigned in view of her approaching marriage, and was presented by the staff with a dinner service and a butter and jam dish.

Miss M. JAKES, of Battersea Exchange, has resigned.

Miss B. BERRY, of Battersea Exchange, has resigned.

Miss E. A. CLAYDON, of Mayfair Exchange, resigned to be married, was presented with a tea service and a case of fish knives and forks.

Miss E. D. WEBBER, of Mayfair Exchange, has resigned.

Miss E. R. TILLOCK, of Mayfair Exchange, has resigned.

Miss W. M. BROOKER, of Mayfair Exchange, has resigned.

Miss E. M. FOSTER, of Mayfair Exchange, has resigned.

Miss EMILY G. STREET, of London Wall Exchange, has resigned to be married, and was presented by the staff with a dinner service and several other useful gifts.

Miss POLLIE GRAVES, of the Trunk Exchange, has resigned on account of her approaching marriage, and was presented by the staff with cutlery and other gifts.

Miss G. LAAR, of Trunks, has resigned.

Miss E. KIRBY, of Trunks, has resigned.

Miss EMERSON, of New Cross Exchange, has resigned.

Miss M. V. BEES, of New Cross Exchange, has resigned.

PROVINCIAL STAFF.

Miss M. A. McLOUGHLIN, Telephonist, Cork Exchange, who resigned to be married, was presented by her colleagues with a silver tea service.

Miss K. M. LANGRIDGE, Telephonist, of Eastbourne (Local Exchange), resigned on Nov. 20 in view of her approaching marriage, and was the recipient of a case of silver teaspoons and sugar tongs from her fellow-workers.

THREE POINTS OF INTEREST TO THE MAN ABOUT TO FURNISH

N ^o 1	ORDINARY HIRE FIRMS CHARGE INFLATED PRICES FOR THEIR GOODS AND YOU DO NOT KNOW WHAT YOU ARE CHARGED FOR THE ACCOMMODATION.	N ^o 2	WE SEND YOU TO RETAIL FIRMS WHO SELL FOR CASH ONLY & NEARLY ALL OF WHOM MARK THEIR GOODS IN PLAIN FIGURES.	N ^o 3	YOU PRESENT OUR SELECTION ORDER AFTER YOU HAVE MADE YOUR SELECTION AND ASCERTAINED CASH PRICES SEE HEREUNDER.
------------------	--	------------------	--	------------------	---

SPECIMEN SELECTION ORDER S.O. 326

This Introduction must be presented to the Tradesman before leaving the Establishment or should accompany the correspondence if ordering through the Post, and the Goods in every case must be charged to and appear in the Tradesman's Books as invoiced to the Association, and not to the Bearer.

Civil Service Mutual Furnishing Association, Limited,
15, CHARTERHOUSE STREET, HOLBORN CIRCUS,
LONDON, E.C., *January 1st 1914*

Messrs. *Furniture Dealers*

PLEASE ALLOW THE BEARER, Mr. *Belmont*
to select Goods for us to an amount of £100 ——— and Invoice the same to us, on the understanding the Association incurs no liability until the order is confirmed by them.

G. F. MITCHELL, Secretary.

WE CHARGE INTEREST 4½%, REPAYMENTS SPREAD OVER ONE YEAR - THE LOWEST & BEST TERMS OBTAINABLE FOR FURNITURE ON EXTENDED PAYMENTS.

TWO AND THREE YEAR TERMS CAN BE ARRANGED.

SEND FOR PROSPECTUS POST FREE



HAND PAINTED PORTRAITS IN OILS or WATER COLOURS.

On Canvas and Stretcher. 15 x 12 inches.

PRACTICALLY LIFE-SIZE.

10/-



10/-

Do not keep photos of your dear ones hidden away in albums. Have their features before you in the natural colours of life. For 10/- we supply a permanent Portrait painted in oils or water colours, on canvas and stretcher, size 15 inches by 12 inches (practically life-size), ready for framing. We are making a speciality of Army Portraits at the present time. Accurate likeness guaranteed. Send photo and full details of colour of hair, eyes, complexion, and dress.

ART PHOTOGRAPHY LTD.

(T. & T. Dept.), 47, MINORIES, LONDON, E.C.

HAVE YOU HAD A COPY?

JUST PUBLISHED, a new Edition of the Mode Book, 48 pages of the newest and best fashions, many original ideas, in **Furs, Fur Coats, Costumes, Overcoats, Macs, Blouses, Frocks, Underwear, Shoes, Trunks, etc., etc.**

All supplied on our well-known 'Times' System from

5/-
MONTHLY
strictly private and confidential.

We are the only actual Manufacturing Furriers dealing direct with the profession.

Buy from the Makers.

SPECIAL TERMS
to Telephone and Post Office Staff.



Complete Sets from 35/-
SPECIAL SHOW OF BLACK FOX SETS AND SEAL CONEY COATS.

SEND A CARD NOW FOR THE FUR BOOK.

CRICHTONS' LTD.

Manufacturing Furriers and Ladies' Tailors,
14, CRICHTON HOUSE, DEVONSHIRE SQ.
LONDON, E.C.

(One minute from Liverpool Street Station).

KNOWN AND RECOMMENDED EVERYWHERE

STANDARD TECHNICAL WORKS

Of Direct Interest to all Telegraph and Telephone Engineers.

AUTOMATIC TELEPHONY. A clear description of the Strowger Automatic Telephone System as adopted by the G.P.O. By S. TURNER, E-in-C.'s Office. 32 pp., illustrated. 7d. net, post free.

TELEPHONE TROUBLES, AND HOW TO FIND THEM. On both the Magneto and C.B. Systems. Sixteenth Edition. 7d. net, post free.

NOTES ON TELEGRAPHY. By G. Mogg. A simple exposition of the rudiments of technical telegraphy and telephony. Specially designed to meet the requirements of the C. and G. ordinary examinations. 2s. 6d. net, 2s. 9d. post free.

THE TELEGRAPHISTS' AND TELEPHONISTS' NOTE BOOK. Third Edition. Handy pocket size, $5\frac{1}{2} \times 3\frac{1}{2}$ inches, with squared pages for Memoranda, Calculations, &c. Highly spoken of by leading P.O. officials. Price 1s. 6d. net, or 1s. 7d. post free.

THE TELEGRAPHISTS' GUIDE. By BELL and WILSON. Absolutely the best and most up-to-date work of its kind on the market. For class teachers and students alike it is invaluable, and the repeated calls for fresh editions prove its merit. Sixteenth thousand. 2s. net, or 2s. 3d. post free.

TECHNICAL TELEGRAPHY. By ROBERTS and BURROWS. Fifth Edition. Contains "Hints to Students," together with an exhaustive selection of questions and model answers in all grades of the C. and G.T. and T. exams. Completely revised. 1912-13 exams. included. 2s. net, 2s. 2d. post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY. By H. P. Few. Includes model solutions to the C. and G. exams. 1904-1914, as well as to several typical questions set at the Post Office Departmental exams. for Overseerships. Fourth edition. Cloth. 230 pages, 172 illustrations. 2s. 6d. net, or 2s. 9d. post free.

PRACTICAL TELEPHONY. By JAS. BELL, A.I.E.E., and S. WILSON, A.M.I.E.E. A simple and practical handbook suitable for students, artisans, &c. Copiously illustrated. Latest edition. Twelfth thousand. 3s. 6d. net, 3s. 9d. post free.

Sent post free at prices stated by

S. RENTELL & CO. Ltd., 36, Maiden Lane, Strand, London.

WRITE FOR CATALOGUE NO. 36.

The United Kingdom Postal, Telegraph, and General Civil Service Benevolent Society. (Assurance Companies' Act, 1909)

JOIN

THE NORTHAMPTON

Section A—For Ordinary Life Assurance,
" B—For GRATUITY BENEFIT,
" C—For Insurance of Wife.

MAXIMUM BENEFIT { Section A ... £150
" B ... £150
" C ... £48

The only Society in the Service, having similar objects, which uses tables drawn up by an Actuary.

Rapidly Increasing Reserves.

Economic Management.

No Shareholders' Profits to pay.

Join the Best and Soundest Society.

Contributions according to age. The younger you join the higher the benefit.

APPLY LOCAL SECRETARY, OR OF

W. T. BRAIN, CENTRAL SECRETARY, 19, Surrey Street, Strand, W.C.

CIVIL SERVICE

Share Purchase and Investment Society, Ltd.

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year. 2 Years. 3 Years. 5 Years. 7 Years. 10 Years.
17s. 5d. 9s. 1d 6s. 3d. 4s. 1d. 3s. 1d. 2s. 5d.

Stocks and Shares bought or sold through the agency of this Society.
Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society exceeds the sum of £500,000.

Just Published.

Price 6s. net.

THE WIRELESS TELEGRAPHIST'S POCKET BOOK

of Notes, Formulæ, and Calculations.

356 pages.

By DR. J. A. FLEMING.

Roan Binding.

Revised Edition now in the Press—Ready this month.

HANDBOOK OF TECHNICAL INSTRUCTION FOR WIRELESS TELEGRAPHISTS.

By J. C. HAWKHEAD & H. M. DOWSETT, A.M.I.E.E.

Price 3s. 6d. net.

A complete course for the Postmaster-General's Examination.

THE ELEMENTARY PRINCIPLES OF WIRELESS TELEGRAPHY.

By R. D. BANGAY.

Price 1s. net.

The above book has been specially written to meet the requirements of beginners.

THE

YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1915.

CONTENTS:

A unique collection of the Laws and Regulations relating to Wireless Telegraphy throughout the World.

A complete alphabetical List of Land and Ship Stations with their call letters.

A Glossary of Technical Terms printed in Five Languages.

Map of the Wireless Stations of the World, giving location of over 700 stations.

International Time Signal Regulations. Together with a vast amount of exclusive information upon technical subjects.

900 pages.

Price 3s. 6d. net.

Illustrated.

Postage: United Kingdom, 6d. extra; Abroad, 1s. 4d.

THE WIRELESS PRESS, LTD.
MARCONI HOUSE, STRAND, LONDON, W.C.

Silk and Cotton-Covered H.C. Copper Wire,

Asbestos Covered Wire,

Charcoal Iron Core Wire,

Resistance and Fuse Wires.

Binding Wires,

&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
13259 CENTRAL.
"ORMISTON, LONDON."

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.

It would be appreciated
if readers would
kindly mention the
Telegraph and Telephone
Journal when responding
to advertisements.

THE Telegraph and Telephone Journal.

VOL. II.

FEBRUARY, 1916.

No. 17.

CONTENTS.

	PAGE		PAGE
"EXPRESS"	89	HIC ET UBIQUE	103
WRITTEN COMPLAINTS	90	THE ADSIT COMPANY AND WAR ORDERS	104
PRINTING TELEGRAPHY—HIGH SPEED AND LOW SPEED. BY DONALD MURRAY, M.A.	91	THE RECENT STORMS	104
OUR MONTHLY RECORD OF BRAVE DEEDS	96	TELEGRAPHIC MEMORABILIA	105
A TRAFFIC DEPARTMENT IN THE NEAR EAST.—II. BY FLORENCE J. MINTER	97	SUPERVISION AS SEEN FROM BELOW. BY S. A. COASE	107
A COURSE OF INSTRUCTION IN FIELD TELEGRAPHY AND TELEPHONY. BY R. BAXTER	100	THE DEFICIT ON THE TELEGRAPHS. BY W. H. F. WEBB	108
MORSE'S BELIEFS	101	PHONOGRAMS. BY B. R. MEAD	110
EDITORIALS—		CORRESPONDENCE	112
DUNDEE CAKE	102	LONDON TELEPHONE SERVICE NOTES	113
"SOME" ADVERTISING	102	PERSONALIA	114
OUR READERS IN THE FIELD	103		

Subscription : To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies : To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

"EXPRESS."

IN a recent number of the JOURNAL a writer commented on the neglect of the public to make itself acquainted with the contents of the Postal Guide. It is certain that the "Guide" shares with those publications which are classed under the generic term of "Blue Books" and "White" papers a popularity limited to public libraries, public servants, and public officials. You would never think of searching for it in a public-house. Nor does the likeness end there, for the "Guide," like many of the volumes that are issued from the Government press, is an index of national endeavour, and a record of at least one indispensable method of public communication. Yet despite its utility, I am sure Charles Lamb would have placed it in his catalogue "*Biblia abiblia*"—one of the books that are not books. It would be of a goodly company. "I reckon," says he, "Court Calendars, Directories, Pocket Books [the Literary excepted] (why has that disappeared or has it grown into the Literary Year Book?), Draught boards, bound and lettered on the back, Scientific Treatises, Almanacs, Statutes at large; the works of Hume, Gibbon, Robertson, Beattie, Soame Jenyns; and generally all those volumes which 'no gentleman's library should be without'; the Histories of Flavius Josephus (that learned Jew), and Paley's Moral Philosophy." Truly, Lamb—"The Gentle Elia," would have blown a Jack Johnson hole in Mr. Dent's "Everyman." But I am not following the Guide. Some day when we have beaten the Germans, we shall borrow an example from them and include in the curriculum of at least our Younger Universities, in the Faculty of Commerce, a course of lectures on the Post Office—its functions and its place in national and international life. An examiner, setting an essay subject, asked "Can the habits of a country be judged by its advertisements?" A companion subject might be "Can a nation's development be gauged by its postal facilities?" and were it introduced in an open competition we should learn how little is known of its ramifications. My title is getting up steam.

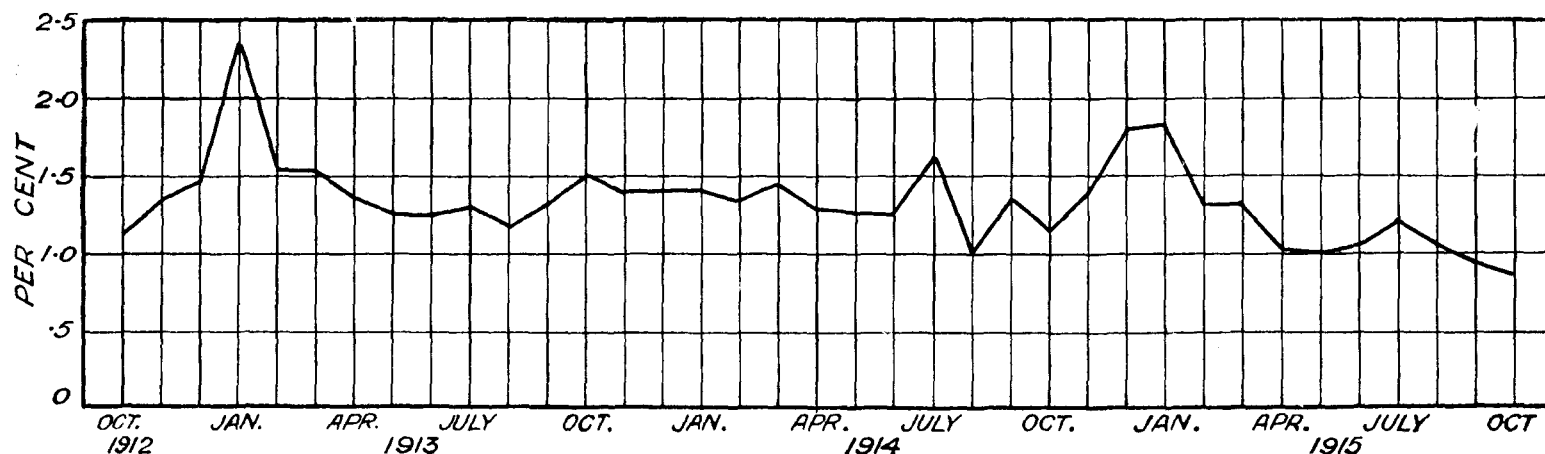
The Express Service was introduced on Lady-Day, 1891, and in its first year dealt with 108,000 letters. In ten years it increased sevenfold and has since shown a gradual development, and last year reached an aggregate of 2½ million transactions. It has throughout been essentially a Metropolitan Service. More than

half the total belongs to London. The provincial share is still under the million as against 1,400,000 for the capital, and the whole of Scotland only accounted for 104,133 transactions. Ireland was even more backward with little more than a quarter of that very inadequate result. So far then the Express Service has not found very great favour with the public, and compares very unfavourably with the telegram. It would be interesting to know how London would take to a pneumatic post such as is available to the Parisian. Such a service would be unsuitable outside London for none of the villages that make up urban provincial England has the means for the trial. Now that the War Office has been an extensive advertiser—not of its wares but of its wants—other Departments may pursue the precedent. "8d. a mile" made a successful appeal to the public, why not "3d. a mile" (with special advantages to telephone subscribers).

This opens up another channel. The phonogram has already established itself as a valuable auxiliary to the telegram. As a service it is daily proving itself more popular, especially as a purely business adjunct. In that its communal usefulness compares well with the express letter, handed in over the counter. There are good grounds for suspicion that the latter is the readiest and cheapest device to evade the Street Betting Act. The figures that the Postmaster-General will issue in his next annual report—which may be in the hands of the public before this note appears—will afford an opportunity for more accurate deduction. The phonogram, on the other hand, has solved a problem for the works manager. No longer does he find it necessary to despatch a boy to the nearest telegraph office. He can lift off his own receiver, get a ready connexion to a central telegraph office and dictate his message. His pad is at hand to make a copy when it is repeated back to him.

Will the new telegram rates convince him that the telephone letter is equally valuable?

The saving that the Postmaster-General expects to make on a full year's traffic at the new rate is estimated at roughly three-quarters of a million pounds. This includes both increased revenue (estimated at £410,000) and decreased expenditure. The latter item is hardly expressed so clearly as is Mr. Samuel's habit. In his speech in the House of Commons he said: "We hope to be able to effect . . . a saving of £70,000 in the near future, and we hope also that we may be able to make a much larger saving, perhaps amounting



to as much as £200,000 when . . . we have been able to adjust the staff to the new conditions of traffic. That will be a total from revenue and saving on expenditure of £740,000." It would seem to be evident therefore that the ultimate expected saving is really £200,000 + £70,000, not £200,000 — £70,000, or in other words that these items represent separate and distinct economies in staffing. From the figures furnished it is permissible to indulge in the speculation that the loss of traffic has been estimated at about eight millions, or, considering inland telegrams alone, since the foreign traffic—already greatly interfered with by hostilities—can be little affected, and the Press rates remain for the moment unchanged, 11 per cent. What proportion of that 11 per cent. will find its way into the novel channel already provided for it? We may be sure that the greater proportion represents local traffic, which could be disposed of at the cost of a call and a junction fee in addition to the express charges. The number of telephone express letters dealt with in 1913-14 was 226,400, representing an increase of 2 per cent. over the previous year. The policy of providing public call offices on Post Office premises had not yet been carried far, and sixpence for a telegram finished the making or breaking of an appointment—an even coin. With the telephone becoming daily more familiar to callers and the rise in the cost of a telegram amounting to 50 per cent., it may be that the public will pause and consider whether it is not worth while to get into direct touch with the distant office and dictate a message, knowing that it will thenceforward secure the privileges hitherto reserved for its elder and more pampered relative. The financial aspect may not appear quite satisfactory upon examination, but if it were desired to popularise the Service, a once-notorious catch word combines the advantages of brevity and familiarity: "Local messages—9d. for 5d."

E. C. G.

WRITTEN COMPLAINTS.

Is the number of written complaints a true standard by which to gauge the subscriber's opinion of the telephone service, or to put the matter more directly, does the absence of written complaint justify the Administration in saying that the service given is satisfactory?

Many factors require to be considered before an answer can be given. The hostile critic will say that people will suffer a good deal before they will take the trouble to write, and that when they do complain, they get little attention and stop complaining altogether. On the other hand, those who have had experience of serving the public in any capacity, know that the Britisher jealously guards his right to complain and makes full use of it.

Those with inside knowledge know that the exchange manager who is keen on his work makes such arrangements for reporting any fault which may be noticed by a telephonist, that the matter has attention very often prior to the subscriber himself becoming aware that a fault existed.

Moreover, the Post Office has continued the old Company's method of encouraging subscribers to use their own or a neighbouring telephone to speak to the officer-in-charge of the exchange when wishing to make any complaint.

Very often it is found that the spirit in which a complaint is received determines the success or otherwise of the procedure. If the monitor's tone is correct; if by it she gives the subscriber the impression that the Post Office regrets the necessity for his complaint and that the matter will be carefully looked into, then the battle is half gained and the number of written complaints is kept down to a minimum.

For what it is worth, however, and knowing from experience that no serious general lapse will occur before an indication of same is revealed through the letters received, a curve is given indicating monthly the percentage of written complaints to stations in the provinces extending over a period of three years. It is satisfactory to note that for the month of October 1915 the figure reached low-water mark. Even if a traffic balancing factor were introduced, the figure is a satisfactory one.

The complaints cover all service matters as well as apparatus troubles.

A schedule is given below for the month of October 1915 giving the percentage of written complaints to stations for each district. It will be seen that there are great variations, and the staff interested in each telephone district will be able to spot its own particular place in the table. The names of districts are not given as this would be unfair owing to the varying condition of plant and system in use.

PERCENTAGE OF WRITTEN COMPLAINTS TO STATIONS (OCTOBER 1915).

District.	Percentage.	District.	Percentage.
1	.11	24	.68
2	.15	25	.69
3	.17	26	.74
4	.27	27	.78
5	.356	28	.79
6	.358	29	.85
7	.42	30	.86
8	.45	31	.873
9	.46	32	.879
10	.47	33	.923
11	.48	34	.924
12	.49	35	1.01
13	.50	36	1.03
14	.51	37	1.14
15	.525	38	1.15
16	.527	39	1.22
17	.59	40	1.23
18	.63	41	1.17
19	.635	42	1.4
20	.636	43	1.7
21	.638	44	1.8
22	.64	45	2.04
23	.641		

PRINTING TELEGRAPHY—HIGH SPEED AND LOW SPEED.

METAL STORAGE TRANSMITTERS.

By DONALD MURRAY, M.A.

REFERENCE was made in the TELEGRAPH AND TELEPHONE JOURNAL for September 1915 to an Italian invention for automatic transmission on the Baudot printing telegraph without the use of tape. This is a very interesting matter, and as it deals with a portion of printing telegraphy that has hitherto received very little attention in print, the following notes on the subject may prove useful to many.

The serious limitations of direct-transmitting keyboards for telegraph work, and the failure of many machines of this kind, notably the Yetman transmitting typewriter and the Rowland multiplex, and the remarkable success that is being achieved by perforated tape transmission, has turned the minds of inventors in the direction of automatic transmission by mechanism not requiring the use of perforated paper tape. The consequence has recently been a considerable outburst of inventive activity along this line. A remarkable machine of this kind is the Piersen storage transmitter for ordinary Morse signals. Kleinschmidt, the inventor of the Kleinschmidt keyboard perforator for producing Wheatstone tape, has also invented a storage transmitter for the five-unit alphabet which stores about 25 letters. Further work upon it appears to be necessary to complete its development. Another inventor reported to be engaged in developing a storage transmitter is Dr. Potts, who took up the printing telegraph mantle of the late Professor Henry A. Rowland, and who has invented probably the most remarkable of all multiplex printing telegraphs. The machine referred to in the paragraph in the JOURNAL for September last was the Taccani storage transmitter invented by Signor Taccani, Director of Posts and Telegraphs at Benevento, Italy. I believe I was the first of the recent revivers of this very old plan of metallic storage transmission, because I made a storage transmitter for the British Post Office nine years ago on the general plan since adopted by Taccani.

Apparently there are only two possible methods of practical automatic transmission in telegraphy, which may be described as follows:—

1. Paper tape transmission.
2. Metal pin transmission.

The use of perforated paper tape for transmission is well known and very successful. Metal pin transmission, that is to say automatic transmission by metallic pins or blocks representing

methods. From time to time metal pin transmission has received a good deal of attention on the part of inventors, the idea being to save the cost of paper tape; but the difficulties in the way are considerable. Modern technical improvements, however, have rendered the prospects in favour of metal pin transmission under certain conditions more promising than formerly, and there are indications of satisfactory development along this line.

Metal pin transmission falls naturally into two divisions as follows:—

1. Pin-wheel or pin-chain transmission.
2. Letter-block transmission.

Zetzsche describes these two classes as:—

1. Pin-automatics.
2. Type-automatics.

In the ultimate analysis they differ only in degree, but the division is convenient for description. Curiously enough, both of these plans go back to the beginning of telegraphy. The first example of pin-wheel transmission is due to Alexander Bain in 1846, and the essential portion of his invention is shown in Fig. 1, taken from *Prescott's Electric Telegraph*.

TYPE.

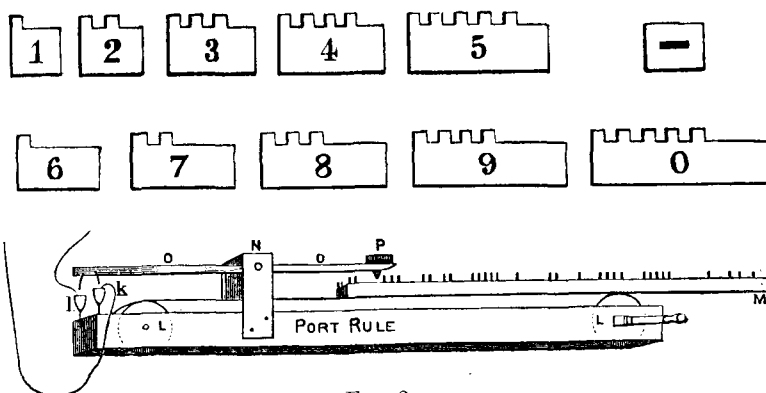


FIG. 2.

The first example of letter-block transmission is the famous "port-rule" of Professor Morse, shown in Fig. 2. It will be noticed that the type-blocks are virtually fixed pins. It is for this reason that I have described all these machines as metal pin transmitters.

Pin-chain transmitters instead of the pin-wheel arrangement have often been invented, also pins arranged spirally on a drum. Amongst others, Siemens and Halske dabbled in the matter 25 or 30 years ago, constructing both letter-block and pin-wheel and pin-chain transmitters.

During 1905-1906 I made a letter-block transmitter for the British Post Office in which a new feature was introduced—namely, a continually rotating ring driven by a small motor, with the letter-blocks sliding in a groove on the ring. This made the Morse port-rule continuous, and enabled the letter-blocks, immediately after they were set into particular letter permutations, to move round and accumulate by sliding at the point of transmission and after transmission to return to the setting point. A view of this machine which I called the ring transmitter, is shown in Fig. 3.

This was the first experimental machine, and a more compactly designed commercial model was afterwards made with the keyboard in front.

Before making the ring transmitter I had attempted to make what I described as a ball-transmitter, as shown in Fig. 4.

In this machine the letters were represented by small steel balls dropped into one or more of five holes in small metal strips or carriers sliding on a continually travelling endless chain conveyor. The balls dropped out of the carriers after transmission and circulated through a tube and a sort of ball-pump to the setting point on the right, where they once more charged the carriers through five valves controlled by the keyboard. The experiment had to be abandoned because no practical plan could be discovered to keep the balls circulating without the risk of choking and jamming.

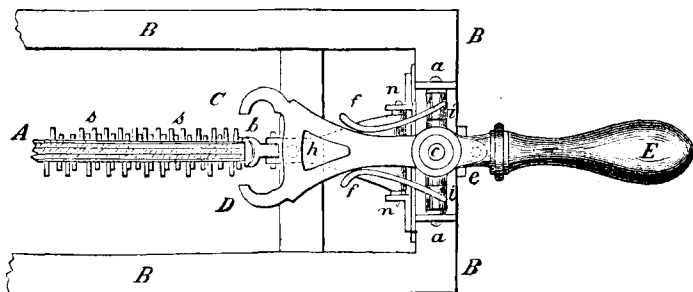


FIG. 1.

letters, assembled before transmission and distributed for further use after transmission, was the first kind of automatic transmission that was tried in telegraphy; but paper tape transmission was so successful that it completely overshadowed and supplanted metal pin transmission. Other methods are of course possible, but they seem to be hopelessly impracticable. The Postal Telegraph Company in America, for instance, started with the Leggo automatic system, employing insulating varnish on a metal cylinder. Paper tape and metal pin transmission appear to be the only practical

If any inventor can overcome this difficulty he will have at his command a very simple metal storage keyboard transmitter.

I mention this machine because negative results are just as important as positive results in the development of modern industry. The negative results show what to avoid, or in certain cases how negative results in the hands of one man can be converted into positive results in the hands of another.

In April 1907 I sent to various telegraph administrations a circular in which mention was made of the ring transmitter,

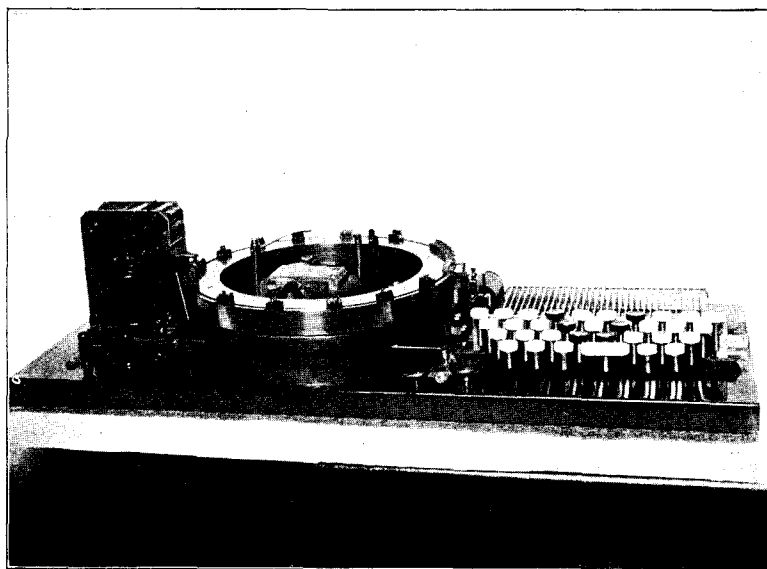


FIG. 3.—RING TRANSMITTER.

and in March 1908 I sent out another circular to various telegraph administrations, including Italy, which contained a photograph and description of all the essential features of the ring transmitter. Whether the Taccani machine received its inspiration from my ring transmitter, or whether it is another of almost numberless examples of inventors independently hitting upon the same idea, I do not know; but the fact remains that the Taccani transmitter is the only one that I know of constructed on the principle of my ring transmitter, and it bears a remarkable resemblance to mine.

The Taccani storage transmitter is illustrated and described in the *Journal Télégraphique* for June 25, 1915, from which the following illustrations and description are taken. A plan view of the machine is shown in Fig. 5, and the method of setting the pins is shown in Figs. 6 and 7.

Referring to Fig. 5, a horizontal disc A is kept in slow rotation about three revolutions per minute, by a belt 15 and a small electric motor (not shown). On the flat smooth surface *a, a*, on the periphery of this horizontally rotating disc, a series of letter-carriers slide being held in position by radial arms p^1 , p^2 , &c. These arms are not necessary, and in the Murray ring transmitter they were omitted, and the carriers were held in place in a groove in the periphery of the disc. This rotating disc with the sliding letter carriers is the same as in my ring transmitter, but in the Taccani machine the carriers are each arranged to contain ten letters, and the pins are disposed in columns vertically. This considerably increases the storage capacity. My letter carriers represented one letter each and occupied one-quarter of an inch along the periphery of the disc, whereas the Taccani letters occupy about one-eighth of an inch, thereby doubling the storage capacity. In Fig. 5 each of the ten pins in one of the carriers, say carrier 4, is the top pin of a vertical column of five pins, each carrier, therefore, having 50 pins representing ten letters in the five-unit alphabet. The friction of the constantly rotating disc A tends to sweep the carriers round in the direction of the arrow, but they are retained at the setting point by the escapement wheel *b*, which is controlled by an anchor escapement and magnet B. The five pins in a vertical column are set in various permutations by one or more being

thrust outward by one or more of the five setting magnets C, D, E, F, G. See also Figs. 6 and 7. Fig. 6 shows one vertical column of pins representing a letter and ready to be pushed out, one or more, in various permutations. Immediately after a letter is set in this way, the magnet B operates the escapement wheel *b* and the carrier 5 moves round one letter-space, about one-eighth of an inch under the friction of the revolving disc. As soon as all the ten letters are set in a particular carrier, it is released altogether and moves round as the result of the friction of the disc, so that carrier 4 for instance ultimately joins carrier 3, and carrier 5 as soon as it is completely released moves round and joins carrier 4. The carriers 1, 2, 3, &c., with their pins set to represent letters are retained at the transmitting point (top of the illustration) by another escapement wheel *n* (this and several other reference letters are upside down in the diagram). The transmitting mechanism S consists of five strips of clock-spring steel carrying contacts which play between fixed positive and negative contacts. Each of these contact springs carries a piece projecting in between the five rows of pins. Every time the magnet R is operated by the distributor it pulls down the oscillating block carrying the contact springs, the contact springs by means of their projections being by this means brought into contact with the pins that have been thrust outward. The springs that strike pins bend and so make the required contacts, which are then transmitted through the distributor into the telegraph line. By this mechanism therefore letters are stored up and transmitted independently of the action by which they are set. After a carrier with ten letters has passed the transmitting point, it moves round as shown by the arrow back to the setting point, where it waits its turn to be reset into a fresh group of letters. The pins are pushed inward back to the zero position by the wheel 16, so that they are ready to be reset again. Carrier 7 shows this operation, and carrier 6 shows the pins all pressed in ready to be reset. The five setting magnets C, D, E, F, G are operated by electric impulses either from a five-key Baudot transmitter or from a suitable typewriter keyboard. In the Murray ring transmitter the letter-blocks are set in their required permutations by one magnet operating on five small rods raised or lowered in various permutations by the keys on the typewriter keyboard. The employment of five setting

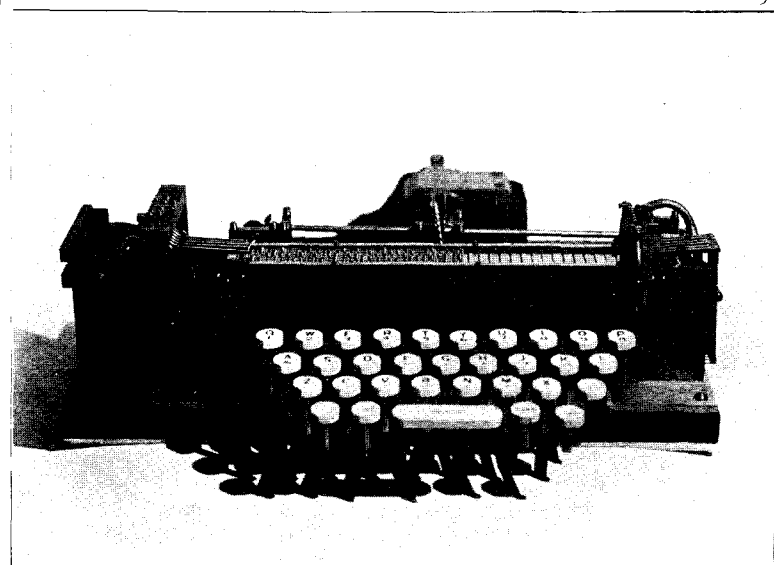


FIG. 4.—BALL TRANSMITTER.

magnets is a little more costly, but it has an advantage which will be explained presently. The Taccani machine as shown in Fig. 5 will store 80 letters, and the scale of the machine compared with the illustration is as 1.75 to 1. The illustration is therefore a little more than half-size and the rotating disc is about $7\frac{1}{2}$ inches in diameter (190 mm). In all essential respects the Taccani and the Murray ring transmitters are the same, except that the direction of rotation is reversed and the letters arranged vertically instead of

horizontally. In both machines there is a revolving friction disc driven by a small motor, and letter-carriers, and transmission takes place by means of the cadence impulse from the distributor operating on an escapement magnet at the opposite point to the setting of the letters. The improvement in the Taccani is the increased storage capacity. The transmitting mechanism is also somewhat simpler in the Taccani.

What may prove to be a useful feature of these metal pin storage transmitters may be explained here in connexion with this Taccani machine, and that is that they can serve as what I may describe as "channel repeaters" at a multiplex repeating station. The signals arriving on any one channel of a multiplex are received

Of course tape reperfors and tape retransmitters can do this work also, serving as channel repeaters at repeating stations, but the fact that the metal storage transmitters require no tape gives them an advantage in this case, because in this case the use of tape confers no advantage over metal pin transmitters. Of course also

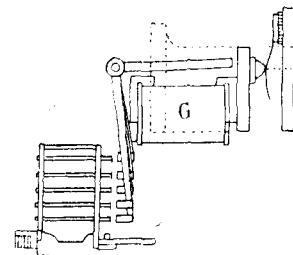


FIG. 6.

"channel repeating" between two multiplex installations can be carried out with the ordinary Baudot retransmitters, as they store up one letter. Hence the Baudot retransmitters can retransmit say from a double installation into a quadruple installation or *vice versa*, but the storage of one letter is not sufficient to enable any channel to transmit into any channel. Transmission can only take place between certain selected channels depending on the phase. It is in this respect that the storage transmitters have an advantage which may prove valuable in the future. It is the employment of five setting magnets C, D, E, F, G, that enables the Taccani transmitter to be used in this way, but the five setting magnets can of course be employed in other metal pin storage transmitters with the same result.

There are certain obstacles in the way of giving practical form to the metal storage transmitter principle. In the case of the Murray and the Taccani ring transmitters, inertia trouble is small, but the friction for driving the letter-carriers is very variable. A little dust more or less makes a great difference. A certain amount of friction is essential to secure prompt motion of the letter-carriers when the escapements operate. On the other hand, the friction pressure on the escapement is very small when there is only one carrier at the transmitting point, and very considerable when there are say eight carriers waiting their turn for transmission. This makes a considerable variation in the maximum possible speed of operation. Also the employment of a motor for the continual slow revolution of the friction disc A is a distinct disadvantage. Indeed it is a disadvantage in all the metal storage transmitters yet made, and it appears to be a necessity for any storage transmitter of sufficiently large storage capacity for multiplex work (except channel repeating). In the case of pin-

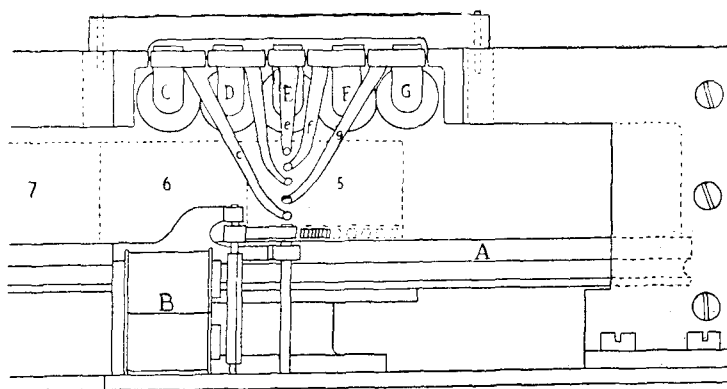


FIG. 7.

on the five setting magnets C, D, E, F, G and they are retransmitted into another channel on another multiplex circuit in due course by the transmitting mechanism already described. It should be noted specially that this use of storage transmitters as "channel repeaters" enables a multiplex circuit of say two or three channels (a double or triple) to transmit automatically into or receive automatically from another multiplex circuit of say four or more channels (quadruple, quintuple or sextuple) in such a way that any one of the two or three channels can transmit into or receive from any one of the four or more channels, all that is necessary being to switch over by hand so as to connect any desired pair of channels. It is quite possible that this may prove to be a valuable facility in connexion with the great multiplex printing telegraph networks that are being built up in all the leading countries of the world.

wheel and pin-chain transmitters the friction trouble is replaced by inertia trouble. These difficulties can be overcome, but they are points to be borne in mind when considering metal storage transmitters. Another disappointing feature is that on paper such machines appear to be very simple and cheap to make; but

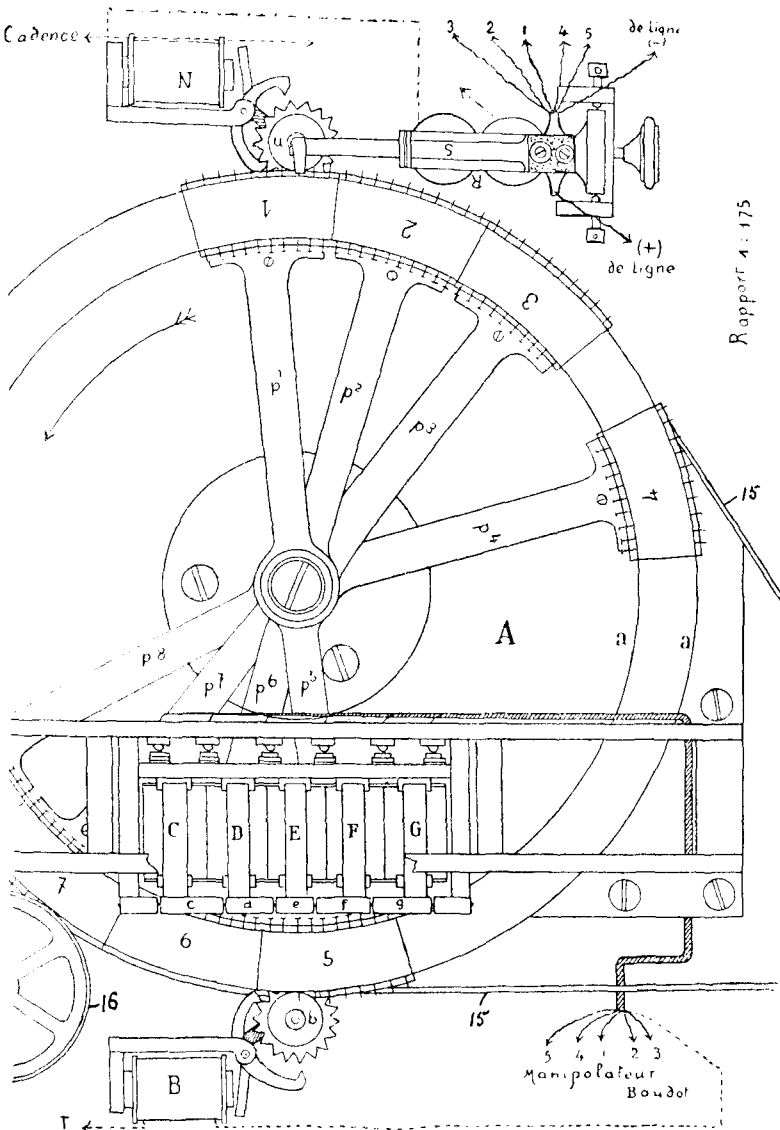


FIG. 5.

in practice I and other inventors who have tackled the problem have found that—by the time they are completed with typewriter keyboards, storage locks and bells to warn the operator that she has exhausted the storage capacity, correcting mechanism for quickly making invisible correction of errors, and also letter-counters for page-printing telegraphs—metal storage transmitters with any considerable storage capacity are little if any less complicated and costly to construct than keyboard tape perforators and tape transmitters, and they do not give the facilities afforded by keyboard tape perforators and tape transmitters. On the other hand they undoubtedly have their particular work to do in the great multiplex printing telegraph networks now being established.

These points that I have mentioned are well illustrated in the case of the Murray ring transmitter. It worked well in the

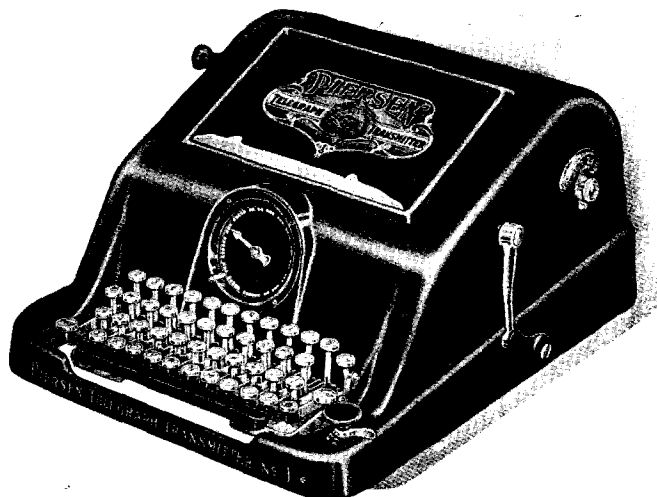


FIG. 8.

laboratory; but for a keyboard transmitter forming part of a multiplex system it was found that there were serious limitations, especially in regard to speed of operation, which led to its abandonment in favour of perforated paper tape transmission. Possibilities in other directions with metal pin transmission did not interest me, as I was concerned only with multiplex development along the most efficient lines. Everything was sacrificed to that end, and the result is seen in the fact that the Western Union has now 25 multiplex circuits in operation in the United States, and has ordered apparatus to equip 25 more lines, and within the next two years will probably have over 100 of such circuits. An American friend writing to me recently says these multiplex installations are "performing miracles" between the large centres.

The sliding friction ring plan was found to require frequent cleaning because otherwise dust and oil varied the friction very much and made it impracticable to provide large storage capacity corresponding to that provided with ease by paper tape. Originally the ring transmitter promised to be cheap to construct, but by the time it was developed, it was found that there was not much difference in cost between it and a keyboard tape perforator. The tape perforator needed a tape transmitter, but the perforator did not need, and the ring transmitter did need a "home-recording" printer, a much more expensive machine. That was a serious addition to the cost, because with a keyboard perforator the perforated tape serves very well as the "home-record."

The Kleinschmidt storage transmitter is of the pin-wheel pattern and stores at present about 25 letters. Those who are interested can find further details of this machine in American patent No. 946,372.

About Dr. Potts's machine I have no information.

Also details are not yet available for publication about the latest form of the storage transmitter which the Automatic Telephone Manufacturing Company of Liverpool is developing.

In my opinion the most ingenious and remarkable of these storage transmitters is the Piersen machine made by the Piersen Telegraph Transmitter Company of Topeka, Kansas. This transmitter is provided, like the others, with an ordinary typewriter keyboard, and can store up from 1 to 71 Morse letters. Fig. 8 shows the machine ready for use, and Fig. 9 shows it with the cover removed.

It will be seen that there is a revolvable pin drum driven by a clockwork motor. Inside the pin drum there is a revolvable transmitter mechanism driven by the same clockwork motor. Another form of the same machine is provided with an electric motor instead of the clockwork. It may be described as the successor of the Yetman transmitting typewriter, and it overcomes the grave defect of the Yetman of having to wait after striking each key till the signals are transmitted. With the Piersen machine, the keyboard, the makers claim, is free like an ordinary typewriter keyboard; but in this as in other storage transmitters the rapidity of action of the keys can hardly be very great, certainly not approaching the rapidity of a good keyboard tape perforator. In other words it may be described, like all the other metal pin transmitters, as being "cadence-free" but not "speed-free." It is likewise provided with an "erase" key for invisible correction of errors before transmission. Also it can repeat all or any part of the message in storage (maximum 71 letters) if the receiving operator "breaks." The makers claim an average of 40 words a minute for it, and state that it sends "an even rythmical Morse which reads like print." British telegraph operators will be specially interested to hear that "the Piersen transmitter saves at least 75 per cent. of your mental energy and more than 75 per cent. of the strain on your arm," and that it is specially useful to men who have "lost their grip" and have "glass arm." It appears to be in the hands of a respectable manufacturing company and not "a stock-selling proposition," so we shall no doubt hear more of it in due course. Unfortunately, I am afraid the Piersen transmitter has been born into the world too late to save the domination of the Morse alphabet. Multiplex and other printing telegraphs using the five-unit alphabet are making such sweeping progress that in a few short years there will be very little room for

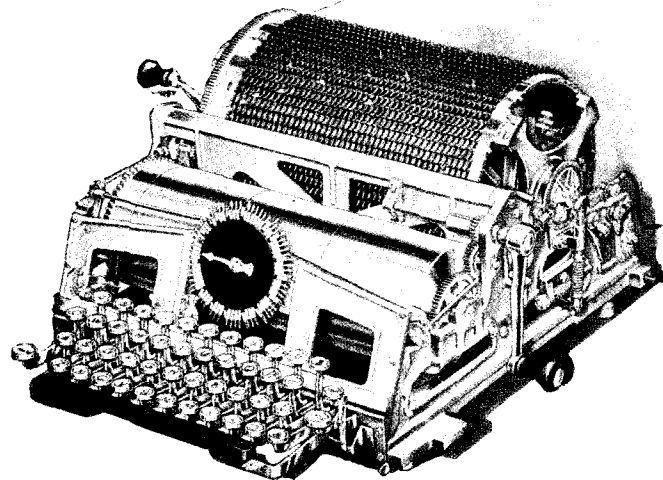
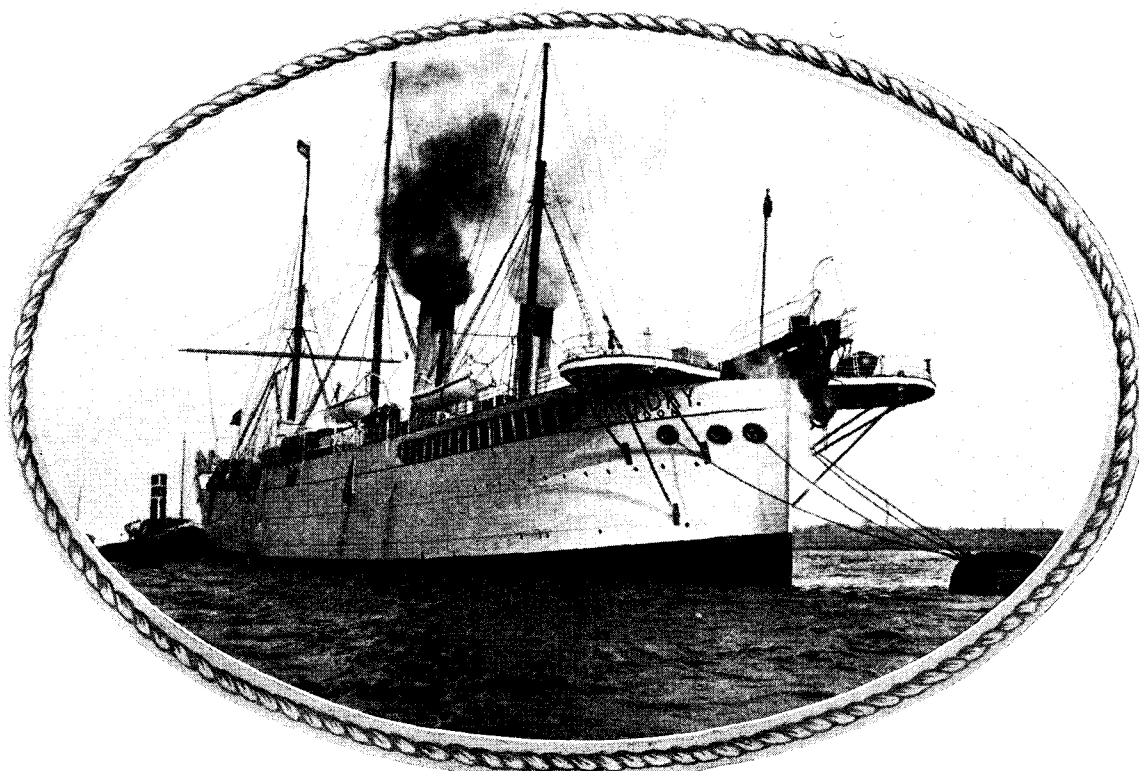


FIG. 9.

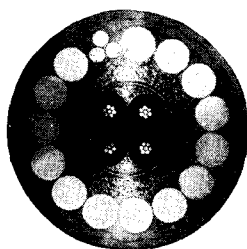
Morse transmitters. Readers will please note in connexion with the illustrations of this machine, my previous remarks about the complexity and cost of construction of metal storage transmitters.

The Piersen transmitter is a really beautiful illustration of this criticism. On the storage drum there are 45 circles of pins or small latches, each circle containing 56 latches, making the total for the machine of 2,520 little movable lever latches pivoted in grooves in the circumference of the drum. Each of these latches has a complicated little sheet metal spring to hold the latch in (1) the zero position or (2) the set position. That makes 5,040 pieces in this part of the machine alone. Inside of the storage

SIEMENS SUBMARINE CABLES



C.S. "Faraday."



Section of Submarine Telephone Cable.



Section showing Coils inserted.

Coil-loaded Submarine Telephone Cables ordered to date:

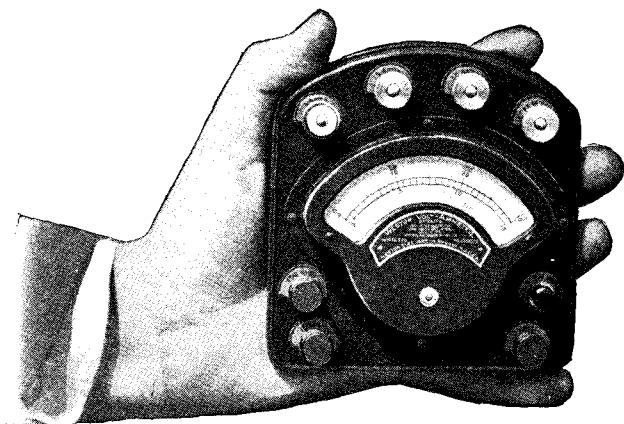
1910	Anglo-French Cable	21	nautical miles (39 km.)
1911	Anglo-Belgian Cable	48	" " (89 ")
1913	Isle of Wight Cable	5	" " (10 ")
1913	Anglo-Irish Cable	64	" " (119 ")
1914	Anglo-Dutch Cable	85	" " (158 ")
1914	Swedish Government Cable	73	" " (135 ")
1915	Danish Government Cable	22	" " (40 ")

SIEMENS BROTHERS & CO., LIMITED, WOOLWICH, S.E.

OVER 4,000 EMPLOYEES.

WESTON

Miniature Precision D.C. Instruments



MODEL 280 VOLT-AMMETER.

This series of Portable Miniature Instruments comprises Milli-voltmeters, Mil-ammeters, Single, Double and Triple-range Voltmeters, Ammeters and Volt-Ammeters.

DELIVERY FROM STOCK.

WRITE FOR LIST D3.

WESTON ELECTRICAL INSTRUMENT CO.

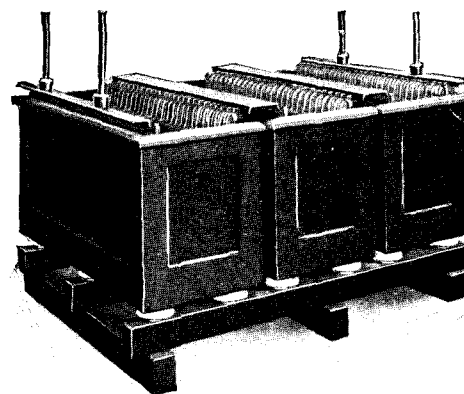
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

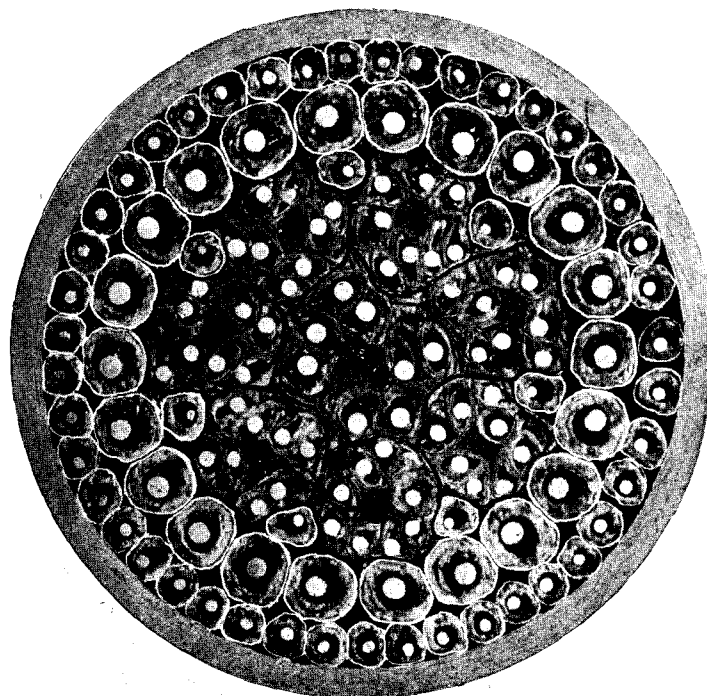
DRY CORE TELEPHONE CABLES.

*Electrical Plant of every description
for Power, Lighting, and Wireless
Installations.*

JOHNSON & PHILLIPS L^{td}

CHARLTON, LONDON, S.E.

ESTABLISHED 1875.



drum there is a whole boxful of most ingenious and complicated mechanism, gear wheels, clutches, springs, levers and character wheels. The total number of pieces in the machine cannot be far short of 6,000, compared with about 300 in the average keyboard perforator and tape transmitter combined. Readers who wish to devote further study to the Piersen transmitter will find full details in United States patent 1,157,040.

So far as multiplex printing telegraph circuits are concerned, the limitations of what I have described as metal pin transmission may be set out as follows:—

1. With metal pin transmission, there is no "home record." Hence a home-recording printer will usually be needed when working duplex, as will generally be the case. In most instances this will more than balance any lower cost of metal pin transmitters.
2. The speed of operation and the number of letters stored is limited. The speed of operation is hampered by the operator frequently overtaking the machine, unless a very large storage wheel is used, in which case friction or inertia gives trouble, or unless transmission is speeded up, and that sacrifices the operating margin on the line and results in increased wear on the mechanism. There is no limit to the speed of operation on keyboard tape perforators. In brief, with metal pin transmission there is not enough room between keying and transmitting to secure the highest operating efficiency on the multiplex.
3. The keyboard of a metal pin transmitter is not completely "free." Paper tape keyboard transmission is absolutely free, and metal pin transmission is a compromise between direct cadence transmission and the free keyboard perforated tape transmission. Well-designed keyboard tape perforators operate with extreme rapidity, especially when using the five-unit alphabet and cross-perforated tape, and 150 words a minute can be reached. It is practically impossible for any operator to strike two succeeding keys so rapidly as to interfere with each other. The paper tape is so light that there are no inertia difficulties. On the other hand no metal pin transmitter is completely free from inertia trouble, and the keyboard speed on such machines cannot approach the speed possible on tape perforator keyboards. The operator is absolutely free on a perforator keyboard using the five-unit alphabet and cross-perforated tape. There is nothing to hamper rapid operation, and therefore labour economy, on busy circuits. There is a comparatively narrow limit to the storage of letters with metal pins and there is no limit with paper tape.
4. Invisible correction of errors is possible with metal pin transmission, but it is not so easy or rapid as with tape.
5. Alternate preparation and transmission of messages is impossible owing to the limited storage capacity of metal pin transmitters, which cannot in practice store up a long message of say 30 words. Alternate transmission from two transmitters to one printer will be found to be a valuable multiplex development by-and-bye.
6. With metal pin transmission it is possible to "re-run" a few words, but messages cannot be "re-run" as they can with tape, and retransmission as distinguished from "channel repeating" is not possible. Retransmission requires tape transmitters in any case, and keyboard perforators are their logical accompaniment.
7. Keyboard perforators and tape transmission are needed for news work, as transmission and retransmission over a number of circuits are impossible with metal pin transmission.
8. Metal storage transmitters require a constantly running motor drive for storage and transmission, and that is distinctly less convenient than the plain magnet operation of modern keyboard perforators and tape transmitters.

Limitations 2 and 3 may be more or less overcome in the future, as inventors may succeed in increasing the storage capacity to say 120 letters; but the other limitations appear to be inherent in the principle of metal storage transmission. Assuming that a multiplex circuit is running at 45 words a minute (270 revolutions per minute) per channel, and that a good typist works on the keyboard for a minute or two at a time at 60 words a minute followed by the usual pauses or reductions in speed so as to average say 45 words a minute, then a transmitter storing 24 letters would be overtaken by the typist in fifteen seconds. In other words there would either be frequent stoppages or slow operation by the typist, thereby reducing the efficiency of the circuit, if it is a busy circuit. On the other hand with a storage capacity of 120 letters (20 words), the typist would have to transmit about 79 words before overtaking the storage capacity of the machine. That is to say he would have to work at 60 words a minute for a little over a minute and a quarter to overtake the machine. 120 letters would therefore be a good storage margin, and such a machine would be practically free from the limitations 2 and 3, always provided that the keyboard can be operated rapidly. A machine only storing 24 letters would suffer severely from limitations 2 and 3 in the case of it being used on a multiplex circuit. The metal storage transmitter that will operate *freely* like a keyboard perforator at 60 words a minute and will store 120 letters is not yet in existence to my knowledge, and according to my experience is hardly to be expected in the future. My impression is that the most promising lines along which such a machine might possibly be made would be those of the Murray and Taccani ring transmitters. It should be noted in regard to the foregoing calculations that the slower the multiplex speed the worse it is for storage transmitters of any kind, metal or tape. Western Union experience shows that a speed of 45 words a minute (270 revolutions per minute) is about right for a typewriter keyboard tape transmitting multiplex, and that the Baudot speed of 30 words a minute is much too slow for any real advantage to be gained from storage transmission.

The foregoing limitations to the use of metal pin transmission apply essentially to multiplex circuits, that is to say to trunk lines with heavy traffic. In certain cases metal pin transmission may prove useful on multiplex circuits; but it seems to me that the field for which metal pin transmission will be found to be peculiarly suitable is on the less busy circuits where a printing telegraph giving a single transmission each way (with or without the duplex balance) will handle the traffic. A number of printing telegraphs of this kind are being developed, which may be described as successors of the Hughes. One of these systems, a British invention, due to Mr. H. H. Harrison, holds out fine promise of success, and for such a machine a metal pin keyboard transmitter of a simple and not too ambitious character would be very satisfactory. The advantage would lie, not in the saving of tape, but in giving a practically free keyboard without high speed of transmission on the line or high-speed printing. That is to say, the operator could strike the keys on the keyboard with a fair degree of rapidity without having to wait for the signal group to be transmitted after striking each key. In other words the keyboard would be practically free as in the case of a keyboard perforator or typewriter. There would be no cadence or time element to be observed in operating on the keyboard. This is a valuable feature, which has been attained hitherto only by tape transmission or by speeding up transmission so that the signals go out to the line as rapidly as the keys can be struck. Speeding up is bad owing to extra wear on the apparatus, and the reduction of operating margin on the line. Metal pin transmission, always provided that a machine of the kind can be made more cheaply and more simple in design and easier to keep in order than a keyboard perforator and tape transmitter, will be preferable to tape transmission on circuits where the pressure of traffic does not demand the facilities afforded by tape transmission, such facilities for instance as power to re-run or retransmit a message, or transmit a message over a number of circuits, or the perfectly free keyboard that is a necessity for the most rapid and efficient transmission on a multiplex circuit. On a line where a single transmission each way is sufficient one

can speed up to say 45 words a minute in each direction without serious strain on the printing mechanism and without any perceptible effect on the operating margin on the line, and the metal pin transmission, by taking care of the "peaks of the load," the sudden short bursts of speed on the part of the operator, will add probably another 25 words a minute to the working speed on the keyboard, giving what is to all intents and purposes a free keyboard, sufficiently so at any rate for the less busy circuits, at lower cost and with cheaper maintenance than is the case with tape transmission, always provided that a metal pin transmitter can be made more simply and cheaply than the tape transmission machines.

The original idea in making metal pin transmitters, that the cost of paper tape would be saved, is only of trifling importance with the cross-perforated tape employed on modern multiplex printing telegraphs. The cost of cross-perforated paper tape is approximately 1s. 6d. for 3,000 messages, the average cost of paper tape for each keyboard perforator being only about 3d. per day (480 messages). The saving of tape is therefore trifling. The real advantage will lie in securing a free keyboard by simpler and cheaper mechanism than a keyboard perforator and tape transmitter, on less busy circuits where lower pressure of traffic does not entail the sacrifice of efficiency that would result from metal pin transmission on lines with heavy pressure of traffic. The requirements for such less busy circuits are much less ambitious than in the case of multiplex circuits. The storage capacity does not need to be so high and the machines can be simpler and more cheaply made, at least I hope so, especially in the case of a tape-printing system.

OUR MONTHLY RECORD OF BRAVE DEEDS.

Captain W. M. BATCHELOR, Royal Engineers, Signal Service (Assistant Superintending Engineer, Northern District), has been mentioned in despatches.

Captain G. H. COMPORT, Royal Engineers, Signal Service (Assistant Superintending Engineer, North Midland District), has been mentioned in despatches.



SECOND LIEUT. A. J. MCCARRAHER.

Second Lieut. A. J. MCCARRAHER, Royal Engineers (Postal Section) (Assistant Surveyor, Class II), has been mentioned in despatches. He was attached to the North-Eastern Surveyor's Office and obtained his commission in the Royal Engineers over a year ago.

Sergeant G. W. WRIGHT, Royal Engineers, Signal Service, (S.C. & T., Scarborough), has been mentioned in despatches. He assisted in restoring communication when the signal office was blown up at Cape Helles and was associated with Corpl. Walker's feat.

Mr. F. S. MACKRELL, Wireless Operator, Royal Flying Corps (Learner C.T.O.), has been awarded the French Médaille Militaire.



SERGEANT W. GAMBLE.

Sergeant W. GAMBLE (Clerk, Windsor) has been awarded the French Médaille Militaire for devotion to duty under fire. He was in charge of important telegraph work in advanced positions at Loos and other recent battles.

We hope to publish portraits and further particulars of the above-mentioned officers.

BRISTOL TELEPHONISTS AND COLLEAGUES ON ACTIVE SERVICE.

A CONCERT was held on Dec. 9 the whole programme being carried out by the telephonists from the Post Office Local Exchange, Telephone Avenue. Mr. T. A. Bates, the District Manager, in a few well-chosen words, thanked all those who were responsible for the movement. This was seconded in an enthusiastic manner by Miss F. P. Nicholls, Supervisor. The weather was not favourable for a good attendance, but owing to the sale of tickets beforehand, the financial success of the object was assured, and will provide a goodly number of cheery gifts for the male members of the Bristol Telephone staff now on active service. The entire programme was carried out by Miss Ivy Yates, Miss M. Batchelor, Miss F. Payne, Miss O. Johnson, Miss M. Burton and Miss J. Turner; Miss M. Tucker and Miss F. P. Bidgood acting as pianists. Miss M. Dauncey and Miss E. M. M. Lloyd greatly helped by selling chocolates to the audience. A great amount of praise is due to Miss Ivy Yates for the arrangement of the musical programme, with the able assistance of Miss M. Tucker.

POST OFFICE RELIEF FUND.

THE statement of account of this fund for the period to Aug. 31, 1915, shows a balance in hand of £21,671. £7,748 has been expended in grants to wives and widows, £103 in Christmas grants to children of deceased P.O. sailors and soldiers, £2,454 on hospitals and £694 in parcels for prisoners of war. £58,740 has been invested in securities by the trustees of the fund. The following decisions will be of general interest.

Motherless Children.—In the case of children on the books of the fund, who, at the time of their father's death, either were, or subsequently became, motherless, the committee have decided that, where such a course commends itself to them, the Government allowance may be supplemented at the rate of 1s. a week for each child.

Christmas Grants.—A special Christmas grant has been made to all children on the books of the fund whose bread-winner lost his life in the war. The distribution was effected on lines similar to those followed last year, the rates being as before, i.e., 6s. 6d. for the first child in the family under sixteen years and 3s. 6d. for each subsequent child.

It is gratifying to note that interest in the fund shows no signs of waning. There have been many concerts and other entertainments given on its behalf, such as the very successful concerts organised by the St. Martin's Old Boys Association and by members of the Post Office at Leeds, Fakenham, Glasgow and Belfast, where the exertions of Mr. Forsythe and Mr. Yarr realised the record sum of £249 4s. 6d., and a performance of *The Passing of the Third Floor Back*, by members of the Kemble Dramatic Society, on Jan. 15 at 3 p.m.

The Home Hospital at 20, Kensington Palace Gardens has recently received a very large number of applications for admission; all of which are dealt with in turn as accommodation becomes available. Most of the patients pass on to the Convalescent Home at Littlestone, or to other places where beds have been offered.

A TRAFFIC DEPARTMENT IN THE NEAR EAST.

BY FLORENCE J. MINTER (*Superintendent of Traffic, Constantinople Telephone Company*).

PART II.

As I stated in my recent lecture, the engagement of staff had its humorous as well as its serious side.

When those at home think of Constantinople, even as a cosmopolitan city, it appears to me that in speaking of its inhabitants the general impression is that they are chiefly Turks. If one counted all the natives of different races who are "Turkish subjects" this would probably be true, but the real Turks are actually in the minority, when one places together in comparison the huge numbers of Greeks, Armenians, and Jews, and the smaller colonies of the French, Austrians, Italians, Germans, English and Russian, to say nothing of groups of Bulgars, Albanians, and many other nationalities resident in that city.

With the exception of the poorer Greeks who are the domestics (though on far more familiar family terms than any servants aspire to in this country, even in these advanced days), and a few Jewesses who are shop assistants or typists, women workers were unknown. To the Greek or Armenian, as to the Moslem women, there was but one career—marriage sooner or later, generally arranged, but inevitable. I, not only as an unmarried woman, but a business one, was a novelty—my mission towards women workers equally so—but apparently there had long been some rebels in the camp who had views other than those of matrimony, and they were as anxious to enter the service, as I later, found them anxious to stay in it.

Some, however, had large ideas of the salaries to be expected if they did take up a business calling. Although totally without business training or experience, they aspired to nothing less than secretarial appointments and positions of responsibility. One lady actually desired my own post, and although acknowledging that she had no idea of telephones or telephone exchanges, felt quite certain she was equal to the duties required.

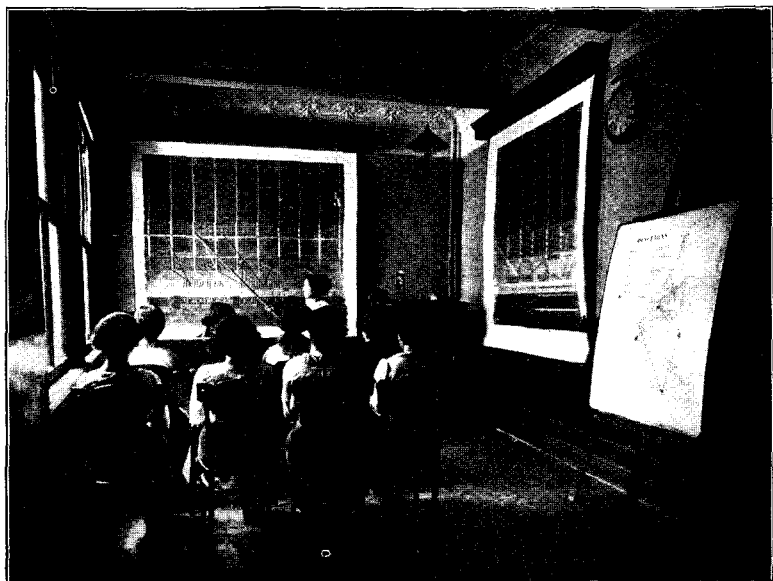


FIG. 3.—VIEW OF OPERATING SCHOOL.

Operators or clerks—male or female, outdoor or indoor staff—all departments had the same difficulties with applicants at first. Apparently it is the custom in Constantinople to accept some personage's introduction as the be-all and end-all required in the shape of recommendations for an employee. To find, therefore, that we were politely ignoring such fulsome statements of their qualifications, and asking them to show by examination their personal abilities, came as a shock and surprise to many.

They have a fine conceit, however, and showed no fear of not being able to learn what we proved they did not know, in some incredibly short space of time. Of whatever nationality the people of that city may be, the self-satisfaction and high opinion of their

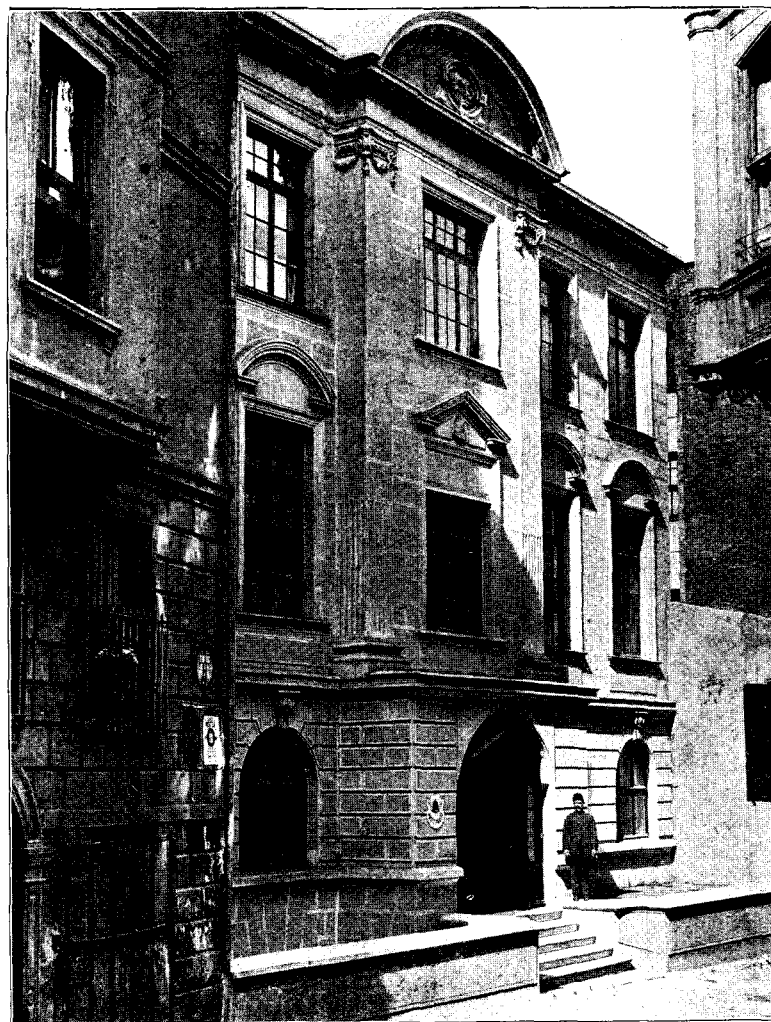


FIG. 4.—PÉRA EXCHANGE IN WHICH THE OPERATING SCHOOL IS SITUATED.

own abilities is most remarkable. I believe I must have often unconsciously stared open-eyed at the arrant conceit shown by some; the self-praise is actually so childlike in its expression and so absolutely surprising in a grown person.

The staff are very jealous also in a stupid petty manner, of their positions and status. I remember one man, an Armenian, who had worked with the original study staff, and subsequently was employed in the Company, who, when staff began to be engaged and classified, instead of being content with his official classification of "cashier" on his staff card, wrote "cashier and several other things besides." That he was not entirely satisfactory, at least in his chief capacity, was soon proved when it came to the monthly balance of petty cash. The chief accountant could not understand the last item of 8 piastres (1s. 4d.), and on enquiry was told "Oh, I couldn't balance by that amount, so I just wrote it in! It is nothing—if I have something less I put it in; if I have something over I put it into my pocket. What is that?" I am sure he had no dishonest intentions, but do not believe all the explanation in the world would have convinced him that it was not quite the recognised way to keep books, and, when his services were sometime afterwards dispensed with, it is certain that he did not appreciate that it was he and not the Company who was in fault, and felt that they were intensely shortsighted in getting rid of so useful a member of the staff.

One young Jew that I took into my office had been trained at the English High School, and possessed a certificate from—I

think—the London Chamber of Commerce, or some such body whose examinations are held in such schools abroad. He appeared promising but was incorrigibly lazy, and on being remonstrated with for being an unconscionable time over some work, explained the matter by saying “Well, you see, I got tired!”

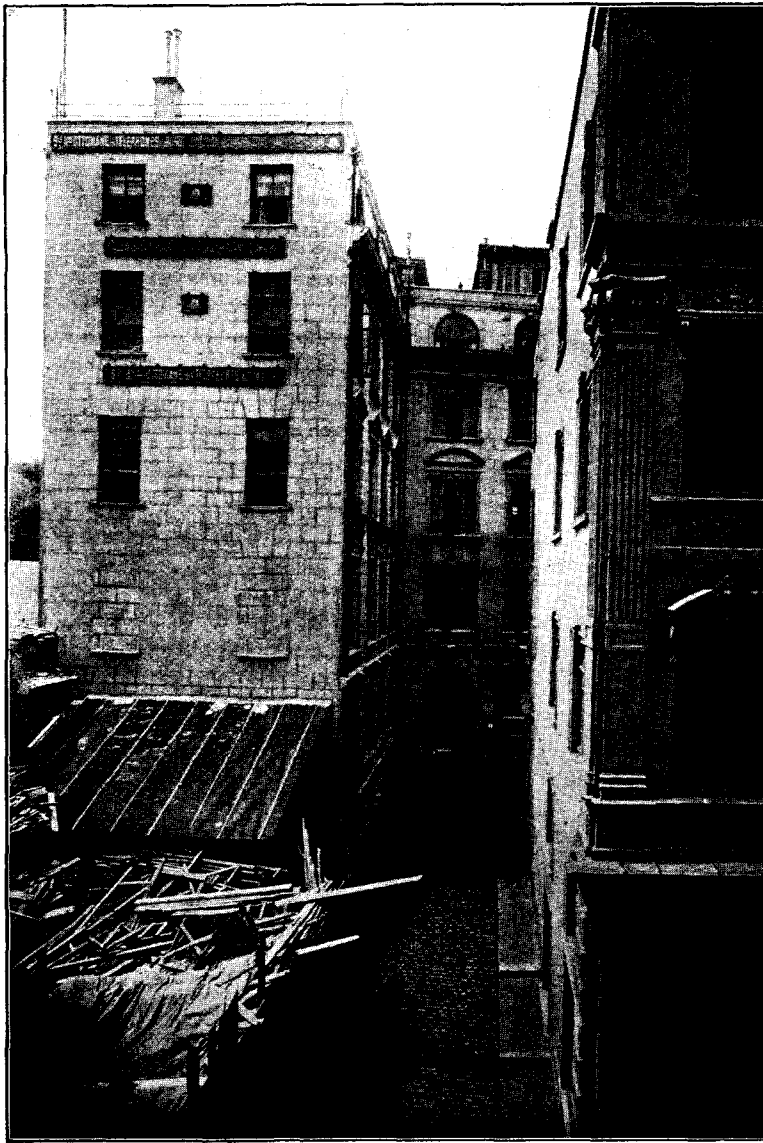


FIG. 5.—TÉLÉPHONE HAN. HEAD OFFICES OF COMPANY AND THE EXCHANGE AT STAMBOUL.

To interpret at the interviews with the staff, the Armenian and Jewish chief supervisors were brought back from London—they also corrected the educational examination papers—since even if I were a linguist, which unfortunately I am not, it would have been almost impossible for anyone but a native to have judged of the candidates' accent or grammar in the many languages of the country.

In spite of all the peculiarities to be met with, with judicious “weeding-out” all departments were eventually successful in obtaining a really good native staff. With but very few exceptions, I had every reason to be proud of my own traffic staff, of the manner in which they worked, and particularly the efficiency which some attained.

The Operating School, comprising a lecture room and a study room, is situated on the ground floor of the Péra building, and was, of course, planned and equipped for normal needs of training, which would be very small in ordinary times, and never exceed ten pupils. To have made it large enough for the 120 pupils necessary at the beginning would have been splendid for six months,

but ridiculous for twenty years. We had, therefore, only the small board familiar to old “National” people in Engineering Circular T2; coloured diagrams prepared by the Western Electric Company of the “A” and “B” boards; and diagrams, prepared from my own copies, of the junctions, opal code, repetition of numbers, &c.

Such a school, sufficient and excellent for all future requirements, was naturally inadequate for the large number of pupils which must be in training simultaneously at the beginning. I had, therefore, the General Manager's permission to commandeer two temporarily spare rooms on the same floor as class rooms, and had five long desks made by a local carpenter to accommodate twenty girls in one of these rooms. To these desks were fitted jacks and headsets.

In the other spare room chairs were supplied, and this was used for study, or aural examinations and exercises. Thus the difficulty of accommodation was met, but there were other obstacles to overcome, generally caused by ever-present delays in the delivery of equipment.

The original idea that the “A” and “B” diagrams should be finished by the local draughtsman, and be as nearly as possible copies of some of the panels of the Péra switchboards was excellent in theory, but proved rather disastrous in practice, since the “A” diagram only arrived a few days before the opening of the school, and the “B” not until ten days after. The construction of the switchboards had scarcely commenced, and the distribution of the junction multiple was then under discussion owing to some proposed deviation from the original proposal for the number of junctions to be brought into use. The draughtsman was working at high pressure on work in the Engineering Department, and could only be spared for a short period daily.

When I think of how well those girl students fell into the actual work later, considering the difficulties of their tuition, I pause and marvel, and think it not only speaks well of their own quickness and adaptability, but reflects great credit on the chief supervisors responsible for carrying through their tuition, and expounding the lectures I had prepared for them.



FIG. 6.—GENERAL MANAGER'S OFFICE, STAMBOUL.

One hundred and twenty students were engaged—six classes of twenty—coming one under the other for six successive weeks. Each of the four chief supervisors was responsible for a class, as they came in week by week. After the first class had gone through the four-week course of lectures and study, the fifth was ready for the chief supervisor responsible for the first class, and the six assistant supervisors, who had received the three months' training in London, were brought back to take charge of the classes in the

different rooms, as handed over after the lectures, for the next stage in their tuition.

In the "practice" room we had school desks to which, as I have mentioned, were fitted twenty headsets with jacks. Here the students were seated with multiple test sheets, and numbers were called to them through an instrument in another room. By this method they learnt to read the multiple, to distinguish between the different multiple pegs, and for some time this was the only method of accustoming their ears to the sound of the numbers through the receiver. Over such classes the assistant supervisors were placed in control, and then came a welcome change. The Western Electric Company's chief installer fitted a section of the Péra board so that we could use it for "dummy" connexions, and the girls could at last handle keys and plugs, and see a switchboard in working condition!

After that several subscribers' instruments were temporarily fitted in different parts of the building, and at all these, girls were in attendance making calls to each other, or were in turn at the boards, making the connexions as required. The six assistant supervisors were again in charge of the classes in this stage, and themselves used the instruments to act as all sorts and conditions of subscribers, much as the monitors act in the Metropolitan school's, but unfortunately, without the means, as in London, to watch the entire operation.

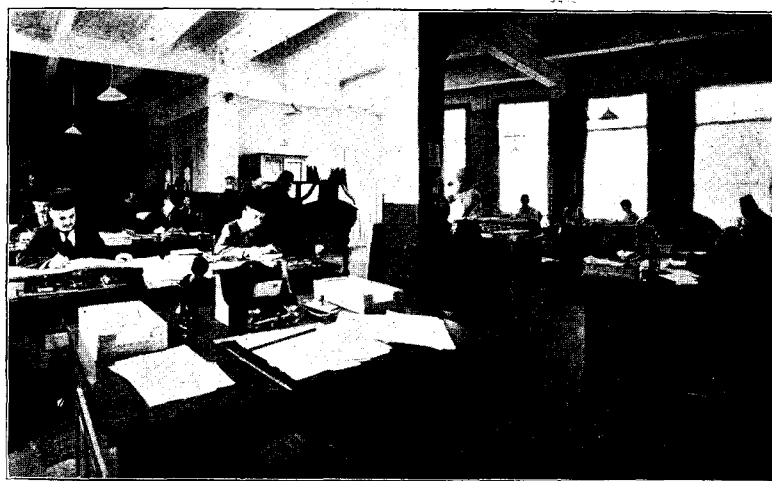


FIG. 7.—GENERAL OFFICE. ACCOUNTS DEPT. STAMBOUL.

All that could be got together to give real practice in manipulation was done, but much indeed had to be left to aural tuition. The students were, however, very eager to learn, showing a real and practical interest in the lessons throughout, and they were intensely excited as the time approached for the opening. The only staff lost directly during the school course was, I believe, three.

At the end of the time set apart for tuition, several Moslem applicants came. Till then, in spite of my willingness to take any who could qualify, only one had come forward—who subsequently became a very useful monitor at Stamboul, where the majority of the subscribers are Turks, and to which exchange the very important Ministerial and Municipal lines are connected.

In an article in a daily paper, to which I have previously referred in this article, this monitor is said to possess wonderful organising powers. As the opportunity to show them naturally never came to her, I can only say that they were never apparent to me, but, since I have left, I have heard that she has been made supervisor-in-charge at Kadiköy, and at once commenced to alter methods, and adopt new expressions—some of these so long that the subscribers got impatient, and suggested that the operator might proceed with the connexion as they had no time to listen to all that explanation.

Of about twelve Moslem girls who applied, six only succeeded in passing the educational test, but these were admitted into the

school and formed, with the monitor referred to in the previous paragraph, the first Moslem women to enter commercial or public life. They were marvellously quick to learn the details of their work, but, with two exceptions, they never learnt to appreciate what was required in business decorum or discipline, and, except when I was present, were rather difficult staff to handle.

The monitor and one other, were content to travel from Kadiköy on the Asiatic side to Stamboul each day—the operator taking charge of what we called the "Ministerial position"—a subject to which I shall refer later. The parents of the others, all of whom lived at Kadiköy—which is a residential quarter for the better class Turks—absolutely refused to allow their daughters to come to Stamboul, expressing fears of what might be expected to happen to them in the way of insult. Certainly it is quite true that it is unusual for a Moslem woman to be out unaccompanied in the city at night, but as pioneers of the Women's Movement, as they undoubtedly were, they should have been as prepared to go to any length as the other two, who never experienced insulting treatment from the public or any annoyance of which to complain.

With these exceptions they had, therefore, to be placed at Kadiköy, and as they could not be relied upon to *work* without another racial element present as example, were actually employed as redundant staff.

One always had an uneasy feeling as to what was happening when they were on night duty, for unless constantly supervised, they would not use the standard expressions and would depart as much as they dared from standard practice. As there was no form of punishment which they appreciated, they formed a difficult staff. Two left to be married—something which must always make for short service with the Ottoman operator—and the Stamboul operator was suddenly taken away by a brother who had returned from Germany, and objected to his sister going to business. The "mere male" has some authority in the Ottoman household!

A fourth left with the 33 operators who were temporarily suspended when, after the mobilisation, it was impossible to keep excess staff in training for the future requirements of the small exchanges whose opening had been indefinitely postponed, or the growth of the large exchanges then necessarily curtailed.

In the Traffic Office, during the tuition of the operating staff, the writing up the cards for the exchange numerical lists; the preparation of the monitors' cards; and the distribution of the three exchanges had been proceeding. The latter was an extremely difficult task, since we could only guess dimly at the possible calling rate of the different classes of subscriber. My method of arranging for this may be, for all I know, quite an ordinary one or very primitive, but it appeared to answer both Engineering and Traffic requirements.

On a sheet of squared paper, diagrams were drawn, representing each answering section of the different panels, and showing the actual position of the answering jacks, on the representative square of which the different numbers to be connected were written in.

Numerical sheets and the card index were made up from these diagrams, and the former supplied in duplicate both to the chief electrician and the contractor's chief installer.

These lists showed the exchange numbers of the subscriber, the panel, answering jack, and meter number (unless of course a flat rate subscriber), and the code of his service lamp. A column was added for date of connexion; the latter being useful as a subsequent check.

These "distribution sheets" were very useful and were still employed in the Traffic Office for additional subscribers up to the time the Turkish Government sent us away. I was obliged to keep such matters under my personal control, my exchange managers not having reached the stage when distribution could be left in their hands—at least so I say—but I suppose they are "controlling" all sorts of things under present conditions.

The monitors' information and panel cards, were fully written up, a light pencil stroke being made across each square where a subscriber's number was shown, this being erased when the line was working; the numerical list at such time being completed with the date, and placed in its proper order and receptacle.

Owing to the inexperienced operators and subscribers, it was

decided to have an unofficial opening of the Péra and Kadikéy Exchanges, joining up but a few subscribers daily, and charging those so connected no rental until the official opening date.

This subject I must, however, leave over for my next instalment.
(To be continued).

A COURSE OF INSTRUCTION IN FIELD TELEGRAPHY AND TELEPHONY.

BY R. BAXTER (*Leeds*).

THE following article is intended to augment, by way of additional information, the papers that have already appeared upon the subject in the TELEGRAPH AND TELEPHONE JOURNAL for the guidance of any members of military and departmental circles who require knowledge of procedure.

Upon receiving instructions it has been our custom to proceed by the earliest possible means to the venue of the required instruction. If in a town it has not been difficult to obtain a suitable billet, but near "camps" this is not always an easy matter. In camp, however, the officer commanding, adjutant or sergeant-major, usually put the instructor upon the track of a suitable tent, or room, bed, &c., in a wooden erection. In such cases arrangements can usually be made with the "chef" of the officers' mess for food to be supplied upon reasonable terms.

Fifty men can easily be instructed in a day in two classes of 25 for four hours, morning and afternoon. A blackboard, chalk, duster, seating and writing accommodation for their men are essential. The duster is an important item. We have had recourse to a piece of a horse's nose-bag, a portion of a soldier's woollen under garment, and an old newspaper, where nothing better could be obtained. The classes usually met at 9 a.m. and 2 p.m. They have been composed of officers, sergeant-majors, sergeants, corporals, bombardiers and men of the rank and file.

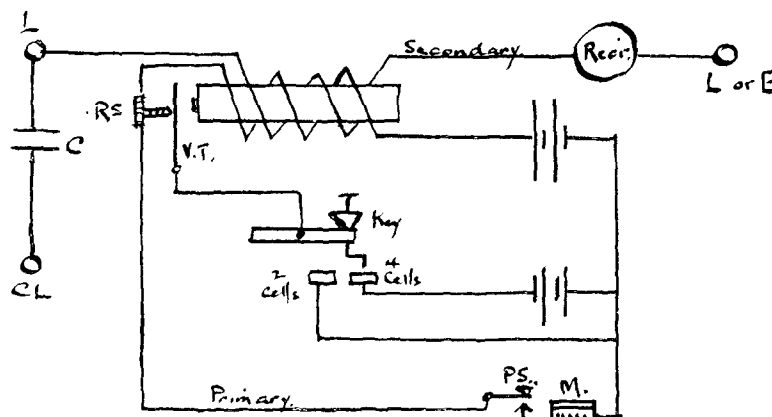


DIAGRAM OF STEVENS' SET.

It will be observed that in the following synopsis of lectures, questions were raised in connexion with the subjects which were lectured upon on six days. The questions were written on the blackboard at the commencement of each class and were replied to in notebooks which the men retained for reference. Each reply was scanned, and where necessary corrected or amplified. A model reply was then given orally before the lecture for the day commenced. This occupied about one hour in the morning and one hour in the afternoon.

We were told by several men that they grasped the subject better as a result of these questions. They stated that if the lectures had been all the information given, they felt that they would not have acquired so much knowledge. An hour and a quarter's lecture then followed, at the end of which, a relief of twenty minutes was given, so that the men could enjoy a smoke. They are considered to be upon parade during the lectures. They then again

assembled and a further lecture of an hour, or a little longer, was given.

A few minutes were finally spent in answering queries orally put by the men. This obtained on seven days.

The eighth day was spent in testing speeds of signalling and reception, following a lecture on cable laying and repairs. Practical hints were given wherever possible.

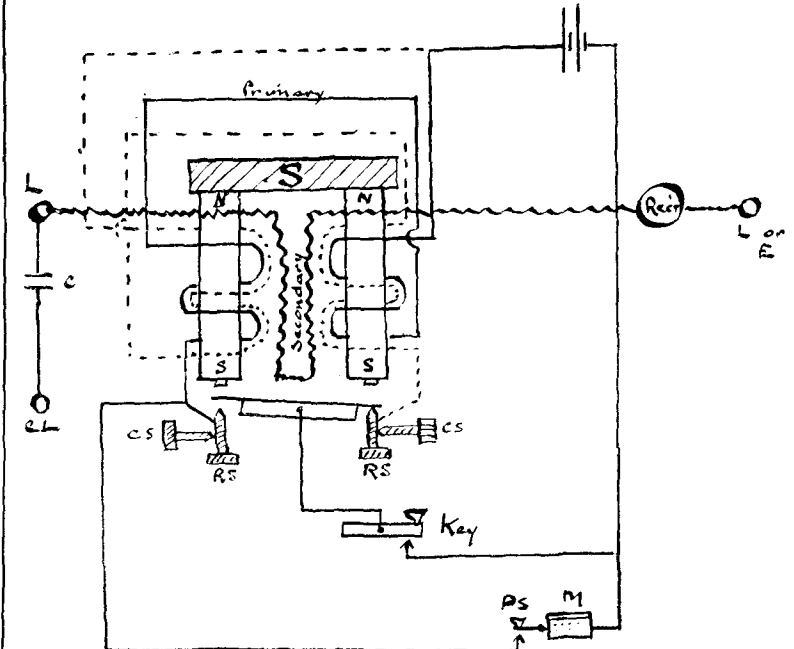


DIAGRAM OF D MARK III SET.

The ninth day was spent out of doors in practical work, and an examination was held on the tenth and last day. The answers were then carefully examined, and marks allotted, after which a summary of the results was prepared. Copies of the summary with reports were sent to the Provincial Superintendent and the Officer Commanding the Brigade. The men's answer papers were sent to the Military authorities.

SYNOPSIS OF LECTURE TO R.F.A. STUDENTS.

Course of Instruction. Theoretical—Eight Lectures.

Lecture I.

Introductory remarks on telegraphy and telephony, electricity and magnetism. A discourse on sources of electricity, *i.e.*, cells, batteries, generators, and dynamos.

Questions set the following day to ascertain how much had been retained, embraced local action, polarisation, cells (their constituent parts), electro-motive force, voltage, resistance, and the repair of dry cells.

Lecture II.

Electricity and magnetism in detail. Practical and theoretical electricity. Temporary, permanent, and electro-magnets, solenoids, charge, discharge, lines of force, attraction, and repulsion.

Questions included the production of electricity; positive and negative charges; magnets and polarity.

Lecture III.

Theory of telegraphy. Theory of telephony, vibrator, condensers, currents and galvanometers.

Questions dealing with a simple telegraph and a simple telephone set, a vibrator, primary and secondary circuits, condensers, resistance of wires, and galvanometers were introduced the following day.

Lecture IV.

The induction coil, telephone transmitters, receivers, lightning protectors, disconnection, earth faults and short circuits.

Questions asked regarding the several pieces of apparatus mentioned above.

Lecture V.

Field telephone set, generator, magneto bell, trembler bell, and apparatus faults.

Questions were set to prove whether the positions, use, and construction of this apparatus were understood.

Lecture VI.

Stevens set and the D. Mark III set.

Questions were put in connexion with the paths of currents and the use of condensers, and diagrams were required.

Lecture VII.

Methods of testing the instruments, the removal of faults, instruction in Morse signalling, telephone articulation, how to deal with figures and difficult words.

Lecture VIII.

The paying-off of cable, cable repairs, ladder and other arrangements of cable laying.

Students were tested in rate of Morse sending and reception.

EXAMINATION PAPER.

(TIME ALLOWED, TWO HOURS.)

Possible marks.	No.	Question.
10	(1)	Draw a diagram and write a description of a dry cell.
30	(2)	Describe with the aid of diagrams, an induction coil, a telephone receiver, and a microphone.
10	(3)	What purpose does the condenser in a D Mark III set serve? Draw a sketch to illustrate your answer.
20	(4)	Draw a diagram of a D Mark III set and mark by letters its constituent parts.
20	(5)	If you failed to hear the distant station's speech in your telephone receiver, state what was likely to be wrong and how you could obtain his message.
30	(6)	Name the points of a D Mark III set which are most liable to become faulty. Describe the faults and state what you would do to remove them.
10	(7)	Describe and show by the aid of a diagram how you would repair a disconnected cable.
10	(8)	Describe any special cable connexion used between points bounding a zone of heavy artillery fire.
10	(9)	What points should be observed in pronouncing words and figures by telephone.

150 Total marks.

MORSE'S BELIEFS.

PROFESSOR TAUSSIG, in reviewing biographies of Fulton and Morse in the May number of *The Quarterly Journal of Economics*, published by the Harvard University Press, says:—

"Morse showed in the early part of his career less evidence of the contriving bent than Fulton. Indeed, in this biography little is said of the evidences of mechanical talent and interest during the first period of his life. More material on this aspect of his career is to be found in previous biographies, and more particularly in that of Prime. It was natural enough that among the devices to which he gave attention as a young man was a machine for reproducing statuary. A piece of mechanism for the same purpose, it may be noted by the way, had also long engaged the interest of a more celebrated inventor, James Watt; like other devices, it was experimented with at least a century before being brought into serviceable shape. Morse was also keenly interested in Daguerre's invention. He corresponded with Daguerre, first suggested the possibility of taking photographs of living persons, and for a while supplemented his income by making such photographs for profit. Nevertheless, it remained true that painting absorbed his interest during his earlier career, and that in later life the one invention to which he gave assiduous attention was the telegraph. The plan for a dot and dash alphabet seems to have

flashed across him during the voyage across the Atlantic on the *Sully*. It was years, however, before he turned to its detailed development—a consequence, as already noted, of the crushing disappointment of 1837. His enthusiasm for art seems to have ceased with extraordinary suddenness when the Congressional Committee in that year refused to give him the commission for painting the Rotunda panel. Thereafter for many years he laboured with a pertinacity that was almost monomaniac on the elaboration of the telegraphic device.

"Morse was an unusual person in every way. He had wide interests and an impressive and attractive personality, but also eccentricity and an unmanageable temper. He was almost always in hot water, carrying on vehement controversies with all sorts of people, and too often quarrelling with his associates. Characteristics of this sort appear commonly enough in the make-up of persons who have the creative temperament. His son, who edits this biography with frankness as well as with filial devotion, admits that there was much to deplore in what was said and written by his father. Morse had strong religious faith of the orthodox sort, and believed himself an instrument in the hands of the Deity for achieving great results. It was no doubt a manifestation of this sort of religious faith that he had an extraordinary fear of the Roman Catholics, and honestly believed in the existence of a Roman Catholic plot for getting control of the United States. This same religious belief explains his attitude toward slavery. One who read the Old Testament with the sort of faith that Morse had might easily believe that slavery was a social condition ordained by divine wisdom for certain communities, and not at all a sin; which in turn explains why he was lukewarm for the North during the Civil War, and might be described as a copperhead. In perfecting the telegraph he felt, with unquestionable sincerity, that he was doing a great work for the glory of God. It gave him vast satisfaction that the first passage which was flashed across the wires was a phrase from the Old Testament: 'What hath God wrought!' He wrote to his brother, 'That sentence was divinely indited.'

"It is not at all inconsistent with a temperament of this sort that he should also have a keen eye for the main chance. It seems tolerably certain in his case that the instinct of contrivance did not operate spontaneously. It was stimulated, if not evoked, by the prospect of gain. Morse turned frankly from painting to inventing as a means of providing for his family and securing a competence or fortune. Those who believe that the instinct of contrivance would work out the same results in the absence of a patent system or other provision for reward will find little confirmation in his career. Probably a similar conclusion would be indicated by the careers of others who, like himself, belong not in the first rank among inventors, but in the respectable second rank. An extremely small number of persons have the contriving instinct with great intensity. A very much larger number possess it in some degree, but are not irresistibly impelled by it. Whatever be the case with those of contriving genius, the inventors who have only high talent seem to need the spur of reward."

Professor Taussig certainly credits Morse with a religious faith of a singularly forbidding type. A belief in oneself as a divine instrument coupled with a justification of slavery on Biblical grounds, a morbid fear of Roman Catholicism, and a keen eye to the main chance is an unamiable combination, and not precisely what is understood in this country as "faith of the orthodox sort." However, Morse's great services to mankind in telegraphy endure, while transient and unhappy controversies have long been forgotten and are only now referred to as throwing additional light on an interesting and many-sided character.

POST OFFICE RIFLES' CALENDAR.

WE have received from the printers, Messrs. A. P. Blundell, Taylor & Co., a calendar for 1916, containing photographs and sketches of the Post Office Rifles in France. It contains photographic groups and portraits, and a series of clever sketches by Sergeant F. H. Turner. It is admirably printed and got up.

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising { MR. JOHN LEE.
Committee - - { MR. J. W. WISSENDEN.
Managing Editor - - MR. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

FEBRUARY, 1916.

[No. 17.]

DUNDEE CAKE.

THE *Dundee Advertiser*, with headlines four in a row, plenteous interlinear headings, notes of interrogation and other attractive devices to catch the eye and rivet the attention of the wayward reader, has been criticising "Our Telephones" pretty sharply in four or five articles of considerable length. When we see the fifth instalment sub-headed "Is State Control a Success?" and espy in the breathing spaces between the paragraphs the words "Broken Promises," "Departmental Mind" and "Long Way to Go" we already begin to fear the worst. Nor are we disappointed, for ere long the patient reader is regaled by such exuberant phrases as "circumlocutory and nebular methods adopted by a host of officials," "official hand prone to dip deep into the money bags of the nation" and "voracious maw of officialdom," so that no one can complain that the promise of the headlines has not been fulfilled in the text.

When the article comes to deal with the sub-heading "Financial Aspect," the critic employs the nebulous—or are they "nebular"—methods which he attributes to officials. We are not clear if he deplores the better wages paid by the Government to telephonists and the increased cost of pensions to the staff. Neither are we clear if he disapproves of the fact that a large sum is set aside for depreciation, and would prefer the insufficient sum which municipal telephone undertakings at times have been blamed for providing. He admits that the cost of engineering supervision was no doubt swollen by the cost of designing and supervising extensive capital works which would go to capital account in an ordinary business undertaking; these increases, he says, put a "bad complexion" on the accounts, and one is left in doubt whether he means by this that the accounts are comparatively healthy notwithstanding their "bad complexion," or whether he thinks their bad complexion is produced by ill-health. Possibly he is ignorant

of the fact that costs which are met out of a Parliamentary vote cannot constitutionally be charged to a capital account as in the case of a trading company. We analysed the telephone accounts in some detail on page 68 of the JOURNAL and do not propose to go over the ground again. But our critic finds the result "by no means encouraging" and asks if the profits are to be swallowed up in the "voracious maw of officialdom." Whether this is a graceful periphrase for the capital expenditure necessitated by reconstructions or for the salaries of the telephonists we leave to our readers to determine.

One of the principal charges against the State, however, is that of broken promises of improved service, and it is here that the two voices of the *Dundee Advertiser* are heard in bewildering contradiction. The telephone exchange in Dundee is admittedly in need of reconstruction, and a scheme for this work has long been under consideration. Owing to circumstances which are well known, many of the exchanges transferred from the National Telephone Company required renewal. Obviously these renewals could not all be undertaken at once, and the financial stringency occasioned by the war has delayed the work in many cases. That of Dundee, concurrently with the extension of the sorting office, is, however, imperative and can no longer be postponed. Straightway the other voice of the *Dundee Advertiser* is heard condemning Government extravagance in Dundee. The usual strident four-header asks "What of the economy plea?" and an editorial talks of the work as a "stultifying performance" "without a shadow of excuse in necessity." Yet two months afterwards the same journal, in the articles first referred to, says: "The war is no doubt pleaded as an excuse, but this cataclysm cannot be made the covering for a multitude of Departmental sins." The *Advertiser* wishes to have it both ways. If the Post Office does not carry out improvements, it is accused of breaking its promises and using the war as a cloak; if it does carry them out, the Government is extravagant and flouts its own recommendations of economy. A colloquialism tells us that we cannot eat our cake and have it. The truism, apparently, does not apply to Dundee cake.

"SOME" ADVERTISING.

THE British attitude towards advertising is somewhat different from that of our American cousins. The Britisher generally considers that expense on advertisement is not good business, unless his advertisements are substantially accurate in statement and the article advertised is one which will be bought on its own merits when once publicity has been secured. There is a large part of the community who misdoubt advertised articles and avoid their use and that of proprietary articles generally. They assume that advertisers are liars all, and they are obsessed with the idea that the salesman has to cover the cost of both the article and the advertising and that the quality of the former is whittled down to cover the cost of the latter. We think that most advertisers in this country will agree with us that this passive antagonism to advertised articles is one of their chief difficulties, and that it would be a mistake—nay, worse, a blunder—for them to attempt by false advertising the creation of a demand for an article, the faults of which become very apparent on use and which would

certainly not be replaced when worn out. No substantial business firm wishes to secure a sale for an article which does not satisfy the customer. They do not want fleeting but permanent business. And they would regard a grossly inaccurate advertisement as calculated to increase the antagonism to advertised goods. Britishers, therefore, like their advertisements to be crisp, attractive and to the point, but they do not seek advertisement by means which would annoy their clients, or which are in doubtful taste. Perhaps an exception can be made in the case of those popular actresses, who we are told sometimes mislay their jewellery purposely and are surprised at the publicity which is given to their misfortune.

Our American cousins do not altogether see eye to eye with us in this matter as will be shown by the article "The Adsit Company and War Orders" which appeared in *Telephony*, of Chicago, on Sept. 4 last. Nobody in this country reading an article of this kind would believe that the *deus ex machina* was the advertisement manager of the Adsit Company. Whether the hyphenated stockholders were a party to the plot, or whether they were hoodwinked by the advertisement manager and are themselves acting in good faith is of no interest to us. There is, however, no justification for the statement that large quantities, or indeed any, of these machines have been ordered by the British Government for use for the Army and Navy War Forces of the English nation and its Allies, and it seems clear that the injunction granted by the District Court of Hennepin County in Minnesota is part of a blatant advertisement. We do not, for a moment, suggest that the Court themselves are responsible for the fraud on the public, although we have it on the authority of Mr. Basil M. Manly, the Director of Research and Investigation in the United States, and Judge Clarke, Chief Justice of the Supreme Court of North Carolina, that the workers have great reason for their view that "The Court by unwarranted extension of their powers in the issuance of injunctions have not only grievously injured the workers individually and collectively upon innumerable occasions, but have by the contempt procedure consequent upon disobedience to such injunctions, deprived the workers of the right fundamental to Anglo-Saxon institutions to be tried by jury." Mr. Manly adds as an established fact that "such injunctions have, in many cases, inflicted grievous injury upon workmen engaged in disputes with their employers."

What, however, we do object to are the blood-curdling "trimmings" which the advertisement manager no doubt deemed necessary. He was obviously at one with the late Mr. W. S. Gilbert who told us that corroborative detail was necessary to convey verisimilitude to a bald and unconvincing narrative.

The corroborative detail entirely fails in its object. The first paragraph is mere bathos and mixed metaphor. It is only proper that the "gory hand" of the "rampant war god of Europe" should be steeped in the placid waters, but the "riling" (irritation) of that inanimate body seems a difficult operation. The anecdote of the German officer who "tapped" a British field telephone and directed the British fire on a place where the German Army was not, is obviously absurd to anyone with the least knowledge

of the actual conditions, and he is apparently an imaginary dog created with the object of wagging an equally imaginary tale.

We, like the Adsit Company, will watch the progress of this case with interest, in order to satisfy our *bona fide* curiosity as to how far the advertisement manager of the company will be allowed to go.

OUR READERS IN THE FIELD.

WE continue to receive letters of appreciation from readers whose activities have been transferred from the office to the field, and who are rendering services which are no longer "civil," although we may remark in passing that in modern warfare, before the introduction of "frightfulness" by the enemy as an established policy, the terms military and civil were not necessarily antagonistic. Needless to say it is with great pleasure that we hear that our record of the current movements in telegraphy and telephony, and our chronicle of the opinions and doings of their comrades at home, interests those who are engaged in the strenuous and devoted work of our forces on land and sea. We are always glad to hear from them, for every detail of that abnormal and barbaric life, now alas! becoming almost normal to so many millions of Europeans, possesses the keenest interest for those who are unable to take an active part in the great struggle, and we shall always welcome any communications which our military readers can find time or opportunity to send us.

In common with other journals we have been beset by the temptation to fill our columns with references to the all-important subject of the war, but we have to a great extent resisted it. In the first place, for reasons which will be obvious to all our readers, exclusive information about the great and worthy part played by the telegraphs and telephones could not be published in these columns during the course of the war, and we were little inclined to offer a re-hash of such war news affecting the Services as was already the common property of the Press; and in the second place we believe that our readers turn to our pages with far other views than to glean military intelligence. We have published, and shall continue to publish, such first hand military articles as are permissible, and such reprints as are of sufficient interest, but in the main our articles will be purely telegraphic and telephonic; and we think, judging from the letters of our friends at the front, that they also prefer to find in the JOURNAL a "link with the old peaceful and civilised life."

HIC ET UBIQUE.

IN response to several demands we have arranged to reprint on good cardboard, suitable for framing, the portrait group of the principal officers of the Telegraph and Telephone Service, which appeared as a supplement to our last issue. Copies will be obtainable at threepence each, and should where possible be ordered through the usual agents with the monthly supply of the JOURNAL, as by this means not only can the cards be sent flat but the cost of postage will be saved. The group was arranged for at short notice, and the Editing Committee were very pleased that they were able to get the necessary photographs of all the principal officers concerned in the headquarters administration of the general Telegraph and Telephone Service of the country.

WE congratulate Lieut.-Col. J. C. CHAMBERS, commanding officer of the West Riding Divisional Train, Army Service Corps, who has been honoured with the Companionship of the Order of the Bath. Lieut.-Col. Chambers is well known to a host of our readers as the Provincial Superintendent of the Northern Province in the late National Telephone Company's administration.

WE are awaiting with much interest the publication of the report of Mr. Burleson, the Postmaster-General of the United States, in which he demands that all telegraphs and telephones shall be made a Government monopoly "as soon as possible." Manifestly some great changes in ideas will be necessary in America before this consummation can come to pass; but this will not be the greatest change which has taken place since August 1914, and the effects of the great European War have long since ceased to be confined to Europe or even to the Eastern hemisphere. The lesson of the importance of nationalisation of public transmission of intelligence is too striking to be lost.

WE take the following story from the *Manchester Guardian* :—

Most of us who are accustomed to the telephone as a constant instrument in business and social life find it hard to remember that some of our leading public men will not and even cannot make use of it. The Prime Minister is well known to have the strongest objections to speaking on the telephone, and there are few people who can boast that they have "rung him up." That perhaps, is sufficient foundation for a story that is circulating in the political clubs. Mr. Balfour (so the story runs) had occasion to telephone the other day to 10, Downing Street on urgent business. A secretary was called to the telephone and told that the First Lord wished to speak. After that the secretary could hear nothing for some moments except a distant and confused mumbling. The secretary was much abashed, and was summoning up courage to request the First Lord to "speak up" when Mr. Balfour's voice suddenly came through clearly as follows:—"I'm very sorry; I'm afraid I'm as bad at the telephone as the P.M. himself. I've been talking for the last two minutes into the thing you ought to put to your ear."

THE *Dundee Advertiser* in an article "Our Telephones," with the sub-heading "Britain lags behind," says that the Germans have experimented with a party line system which ensures absolute secrecy for every subscriber on the circuit, whether two, four, ten or more. "The principal feature," it continues "is a switching relay so constructed as to be extremely sensitive to direct electric currents, yet unaffected by alleviating currents."

That a Teutonic device should be carefully rid of anything "alleviating" seems to be in the fitness of things.

THE following anonymous letter has reached headquarters :—

"It is a public scandal that German firms should be allowed at this critical period the use of the telephone, especially after the vital publication recently issued in the London papers and our local press.

Reference is made to (here follow the name and address) where there are some dark things doing.

We are at War War War

cut them off."

As the firm in question is British we imagine that the cutting off of their telephone is more "vital" to the anonymous gentleman's interests than the safety of the nation.

THE ADSIT COMPANY AND WAR ORDERS.

WE reprint from *Telephony* the following article on which we comment elsewhere :—

The rampant war god of Europe reached out with his gory hand this week and the riled waters of the telephone trade.

The blow fell on the Adsit General Electric Company, of Minneapolis, Minn., manufacturer of the Adsit telephone lockout, when diverse persons including A. Mullhousen, E. A. Mayer and H. N. Falk, all stockholders of the Adsit Company, acting as representatives of a number of other pro-German stockholders, prayed the District Court of Hennepin County, Minnesota, for an injunction restraining the Adsit General Electric Company from selling or negotiating the sale of the Adsit product to diverse persons, doing business under the name of J. B. Saunders & Company, Limited, of London, Cardiff, Swindon, Walshpool, Barrow-in-Furness

and Liverpool, England, said firm being generally known as "Contractors to the War Office," "The Admiralty" and "His Majesty's Board of Works," of England, and it having come to the knowledge of the plaintiffs that such negotiations were predicated on the intended sale and delivery to said J. B. Saunders & Company, Limited, of England, by the Adsit General Electric Company, of Minneapolis, Minnesota, U.S.A., of a quantity of Adsit Company's machines, known as lockout instruments, composed of upwards of some 100,000 machines and that said machines are to be delivered to the Army and Navy and War Forces of the English nation, and its Allies, for the purpose of furthering the progress of the present war, by facilitating secret orders and secret communications, by telephones between Army headquarters and advanced outposts.

And whereas, such use of said machines could only result in a perpetuation of, and a further increase in, the revolting carnage and bloodshed, at which the whole civilised world now stands aghast and, further, in view of the fact that the acceptance and filling of such orders would also exceed the company's charter rights, we, the above-named stockholders, hereby, severally and collectively, pray this court to enjoin the Adsit General Electric Company, its officers and board of directors, and one Thos. W. Hicks, its general manager, from further negotiating such sale of said instruments to be used for such purposes as outlined herein, &c., &c.

"The serving of the injunction was like a bolt from the blue to the officers of the company," said Thos. W. Hicks, the manager, when interviewed regarding the matter.

"It is true that we have been negotiating with several foreign countries the past few months for the sale of lockout attachments. It does not necessarily follow, however, that these attachments are to be used wholly for war purposes and the company certainly does not admit having an order of any such proportions as intimated in the complaint. We have had some little correspondence with the Saunders people and we regard them as the most liable house to act as our foreign representative when we are ready to invade the English markets. Personally I have not read the complaint in full, but I think the parties in acting were hasty and not in full possession of the facts. It might be worth something to know that one or two of the plaintiffs in the complaint are known to have relatives, who are officers in the German Army, and their views regarding the shipping of apparatus of any nature usable for war purposes to England and her Allies might not be entirely without prejudice.

We admit that J. B. Saunders & Company are contractors to the War Office. But they also deal with private firms, and it is just as possible that any machines they have ordered from us, or might in the future order from us, would be used entirely for peaceful purposes. The only evidence to the contrary is to the effect that the extended outposts of the British Army are all connected by telephone to the headquarters of the general staff. These outpost telephones for obvious reasons are connected in multiple, or in other words, the same as an ordinary party line. There have been numerous instances where the enemy has invaded these outposts and stifled the guard before any outcry could be made, and has "listened in" on the line, received advance notice of an intended charge, and so informed the enemy, which immediately prepared to receive the charge at the point designated, resulting in a practical annihilation of the attacking party.

Our correspondence also shows that in one case where a German officer "tapped" a British field telephone line and directed for several hours the concentrated fire of the Allies' heavy artillery on to a space where (of course) the German Army was not. It is true these conditions would be overcome by the use of the lockout, but this fact does not necessarily mean that any present business pending with foreign countries is wholly or in part for war purposes."

Franklin W. Adsit, the inventor and vice-president of the company, said: "The business end of the organisation is in other hands, but if we have received an order for 100,000 lockouts from the Allies, or from anyone else, I think the order should be filled. I think it is all right from every viewpoint to accept such business, and I presume the attorneys representing this company will endeavour to find a way whereby we can proceed in a perfectly legal way."

The date of the hearing to give the Adsit Company an opportunity to show why the restraining order should not be made permanent has not been set, but the case will undoubtedly be watched with close interest by the telephone trade in general.

THE RECENT STORMS.

WE once had a friend with a strange peculiarity for taking a walk in a high wind. He said it "blew away the cobwebs," and on those occasions when the walk degenerated—by opposing forces—to a stagger, and finally to a standstill, the cure for mental and physical obfuscation was assumed to be complete.

Being responsible, in a very mild degree, for the results of some part of the trunk service of this country, the satisfaction we derived from the advent of winds of high velocity is, unlike that of the friend whom we have referred to, strictly qualified. A visit to a large trunk exchange on the Monday after Christmas would, in fact, be sufficient explanation of our attitude in the matter, and the scene in the exchange can only be paralleled by that in the

neighbouring telegraph office, which is suffering in much the same way.

Both in 1914 and 1915 the Monday after Christmas was the day on which a special breakdown of aerial trunk and telegraph lines occurred, and in each case a second breakdown followed quickly on the first. In 1914, the breakdown was due to snow, and in 1915, gales and hurricanes, which spread practically over the whole of the United Kingdom, were responsible. Some idea of the violence and extent of the damage may be gained from the fact that places as far apart as Bristol and Newcastle were each cut off from direct communication with London, and speaking generally nearly half the available lines in the country were disconnected. The gale of 1915 was the most severe, telephonically, that has yet been experienced, and the inconvenience caused, especially under the present circumstances, cannot easily be estimated. Naturally the requirements of the country had first to be considered, and for some time, no sooner was a line made good than it was taken for military purposes.

During, and for some days after, a gale the manipulative staff is able to enjoy what is comparatively a "rest period." Save for a considerable number of complaints and enquiries to be dealt with, little or no traffic can be connected, and the traffic officer with the largest amount of energy and goodwill possible, can but look on.

The reverse is, however, the case upon the engineering side, and the days have to them been days of considerable strain, particularly with the present shortage of staff. We should fail indeed if we did not at this point record the success which has attended their tremendous efforts.

In spite of the depleted staff, hundreds of lines were made good in two or three days, when lo! the elements again made themselves felt, doing far more damage than before, and placing the trunk service generally at a standstill for some hours. It was then that the engineering staff worked a twentieth century miracle, and within a week the service was restored to practically normal conditions.

As a contrast to the general aspect of the picture, the London-Birmingham group stood out like a green oasis in a desert of destruction.

This underground route, the most up-to-date piece of telephone cable in the world, got its first chance of distinction, and magnificently it rose to the occasion.

Practically the whole of the northwards traffic passed over this route, and the Birmingham Trunk Exchange must have felt like rivalling the Birmingham Telegraph Office of the Chamberlain era as the most important transmitting station in the kingdom.

A word of commendation to the trunk telephonists must not, in justice, be omitted. It is no easy task to work a continuous attention route, and keep argumentative subscribers down to a three-minute limit. The work was carried on, however, with unflinching tact and firmness, and the man who had a contract with the War Office for a supply of buttons for "Derby" armlets was convinced—how, we know not—that the delay on his call would not necessarily be fatal to our ultimate prospects of victory.

T. S. X.

TELEGRAPHIC MEMORABILIA.

BOTH from a telegraphic and telephonic point of view of the general member, the December meeting of the Post Office Telephone and Telegraph Society was quite the most interesting gathering of the present session, and gave evidence of the high type of latent talent available, if the society will but attempt to encourage it. Of the three short papers read, that of Mr. Coase undoubtedly struck the highest note. It was the paper of an idealist, and should be read and studied from that point. Entitled "Supervision as seen from below," once removed from official standards, it could then in the broader sense of the term quite aptly have been entitled, "Supervision as seen from above," so much beyond all pettiness and narrowness of thought was every crisp and epigrammatic sentence. The idea of "discipline as first cousin to disciple" gave quite an Emersonian touch to a thoroughly thoughtful

lecturette. Without being impertinent it may perhaps be submitted to Mr. Coase to cultivate a less didactic and pulpit tone of delivery for the next occasion, which everyone hopes will not be long in coming.

Mr. B. R. Mead's paper on "Phonograms" evoked some severe criticism, much too severe was the thought of many, but his courteous and even-tempered replies must surely have disarmed the sternest of his critics.

Mr. W. H. F. Webb tackled a large question in the "Deficit on the Telegraphs," and as a feat of condensation of facts and material scored heavily.

Despite the very unpropitious weather there was a very decided feeling amongst the audience that any personal inconvenience or discomfort had received full compensation in the fare which had been so appetisingly placed before them.

It is noted that the Northampton Polytechnic Institute, London, having made a gallant struggle to carry on the work of education during war time has succeeded in producing a very creditable report, and one is surprised to find that the reduction in enrolments traceable to the war has not been more than 24 per cent. This is probably due to the fact that many students were under enlistment age. The working hours of the students were, however, very seriously affected, showing only 48 per student as against 71 for the previous session. The Institute so well known to London Telegraph and Telephone students had also unfortunately chosen this particular year to deliberately sacrifice the Post Office classes, which as the semi-official pronouncement states, "had become too large for efficient handling."

If some of our technical institutes have had to be content with reduced attendances and a certain diversion of their wonted energies to other not less useful channels, it may surprise some readers to learn that according to letters which have been received from overseas correspondents, "Slingo is at the front!"

One must hasten to correct the first impression that the hard-worked Engineer-in-Chief is somewhere in France, but old "Slingoites" will understand the reference well enough. Latter-day devotees of the combined studies of Telegraphy and Telephony will better comprehend these lines when it is recorded that what practically amounts to City and Guilds examinations, specially adapted for war purposes in field and trench, are being conducted "over yonder." More, so the informants state, there are prizes for successful students somewhat in the nature of augmented increments! Business as usual! The attestation days in the C.T.O. caused more than a ripple of interest among the staff, and it can be truthfully said that every man felt more satisfied to know that he was dropping into his proper and appointed place. As usual the formalities were not without their droll aspect, and the incongruous was certainly reached at that point where, owing to the number of vigorous attestators, the sacred volume was near collapse and had to be tied together—with red tape!

Anent a recent paper and the invention of semaphore signalling the "Office Window" of a daily contemporary accredits that invention to Richard Lovell Edgeworth. It was first used by the French military authorities in 1794, and was introduced into England the following year by Lord George Murray. By this system the Admiralty was placed within a few minutes of Portsmouth or Plymouth. Greenwich time at 1 p.m. daily was passed from London to Portsmouth, and in clear weather frequently acknowledged within three-quarters of a minute. Smart as was this operation the delicate yet accurate action of that wonderful automaton, the Chronifer, independent of haze and the atmosphere generally, leaves the optical system well behind.

The critic must expect to be criticised, and must endeavour not to wince under the recoiling lash. Some time ago in this column reference was made to the imperfect printing produced by certain type printing telegraph systems, and it was pointed out that indistinct impressions brought discredit upon type printing telegraph systems as a whole and particularly upon any one system which neglected to provide a clear-cut, distinct and easily readable copy. The writer has now, in a private communication, been charged with lack of sympathy for type-printing systems and prejudice against one particular innovation.

The only reply that need be given in these pages, is to repeat

with emphasis all that was then written on this subject. To advance as an excuse for a badly *printed* telegram the argument that "some of the *hand-written* telegrams are none too plain" need only be quoted to the average reader to supply its own answer.

Should this be insufficient to some, perhaps an appeal on the score of the eye-strain caused to a number of colleague telegraphists would convince. These latter, during the present dark days and nights, are of necessity compelled to struggle with an abnormal number of Government cypher telegrams by the aid of artificial illumination, and are always grateful for clear well-defined copies from which to re-transmit.

That lively writer, G.K.C., recently discussed on his favourite instrument—the telephone—because, said he, "I know nothing of music," and playfully described the contorted sentences which vibrated through the wire when a friend heard him say, "A happy isthmus," "a snap of bismuth," which he finally identified with the time-worn Yuletide greeting. He added that, "there is only one way of getting through on the telephone: but there are an infinite number of ways of not getting through!" Here surely is a splendid opportunity for our telephone friends to educate an apparently splendid subject of the telephonically speaking "uneducated" public. One hesitates to write that the distorted sentences might have originated in the Christmas condition of the noted critic's would-be correspondent.

Now and again comes the query, "Why does a telegraphist working the Anglo-Foreign circuits in London need to have some knowledge of foreign languages? Do not these 'foreigners' understand English?" Apart from the fact that the Anglo-Saxon tongue is not yet universal, if no effort were made by Britishers at the Beliti end of the wire towards making themselves understood in an alien language the smooth passage of the traffic would frequently become much hampered, especially when one has to cope with such as the following by an aspirant from the other side:—

"What are doing I dont unstand you wat wants was?"

This little conundrum is an easy one compared with understanding the phonetic abbreviations of another tongue than one's own. Should anyone wish to test his or her knowledge of Gallic pronunciation, with a bias towards the accent of the South, the following extract from a conversation carried on by two repeater offices on a circuit where the speed of a London printing telegraph installation was brought into question, may prove as valuable as a week in Paris or as "How to learn the French language without a master!" For the benefit of the uninitiated and for the credit of British apparatus and adjustment it may be stated that the fact of receiving these observations with absolute exactitude was ultimately accepted as a proof of the faultless condition of London's apparatus:—

(M.) "Ohé Jacques esketucla?"

(J.) "Oui, Marius mon vx vions Ldn per 5 cro a chak
"inst é c archi mové de lui enfin vionske me racontetu mé
"c possible alors vois t reteurs—ckya dsur c ke d toi c
"absolument parfé & je ne tche ryen jatends il n é pa kestion
"du fil—

(M.) "D ktu mpace London c mové. Mé archi-
"mové.

(J.) "C tréspocibl enfin je recois excelt dtoi & je ne
"tche rien j atends vla 2 ec ki stks memes. J a tanktu
"fasseskekechose—moi jnairenatcherpiskeditoi c parfé alors
"kevxtu kjyfasse pisque de toi c absolumpur tu vdras pas
"kledfo st ici d fois non?"

(M.) "en trnant lesmanettes ou bin t reteurs vois l
"feu.

(J.) "Jtedis jenesuis paplacé dans l position differé
"plus avek London kvec toi."

Of itself this type of abbreviation is possibly worthy of classification with that excerpted by *St. Martin's Magazine* from the *Newspaper World* in the current issue of the former and quoted by the latter as the fine art of telegraphic abbreviation, thus, "av it niceli
"andikapt," &c.

But to revert to our enigmatic quotation above. Quite apart from this conversational necessity which admittedly is of a highly technical nature, the ordinary needs, corrections, enquiries &c.,

have all to be expressed in the tongue of the "other man," and when expressed by that "other man" are by no means confined to conventional terms and methods. Yet again; even in the "simple" art of *gumming* one has seen the disastrous effects of that "little knowledge" danger, born of the present admitted necessity of a lowering of the language standard. Were it not for the frequent scrutiny of the supervisors and the willing co-operation of the remaining efficient, the result of war conditions would be more apparent. Happily the spirit of co-operation is abroad, and the idealists must be satisfied with that "little less" until this present nightmare is behind us. The great point is, not that the services rendered are at times admittedly less efficient than those one could be pleased with in normal periods, but that the service rendered is willing and whole-hearted.

In this spirit we can press merrily on, extracting that maximum of humour out of the situation which our own "boys" at the front derive even from the grimly incongruous. Thus it is hoped that when one cites the curious happenings which are a feature of present conditions it will not be presumed that such quotations are published in anything but the friendliest spirit. If when signalling the specially endearing term "*tendresses*" of our cross-channel neighbours some fair telegraphist should endeavour to add to the exchequer by counting "ten dresses" as two, we forgive, for it must have been one of the fair sex whose thoughts drifted into the latter extravagant dream, and if when an accoustical telegram informs us that the message is "Via Putney rate" to the Continent that also and without further parley we will take for granted as the result of "local accent" on the 'phone, and thus cheerfully carry on, after due correction to "2d. rate!"

When referring to the cheeriness of our "boys" at the front, the writer had many instances in mind and especially a sight of the programme of a Christmas concert given by non-coms. and sappers of a certain British Army abroad whose telegraphic code is BAR. Some of the names are well known to the C.T.O. and others to provincial telegraph and telephone centres. The conditions for admission comprised such as (1) "Non-C.O.'s and Sappers will not be admitted unless wearing at least one puttee," while among the "Refreshments" provided were the following more or less edible items:—

"Tea, Coffee and Extract of Malt and Hops."

"Boot polish one penny per tin," and

"Oranges, one penny per pip per person."

As a skit on the price of writing material in *la belle France*, note paper was announced to be on sale at the following rates:—

"Tram ticket size 1 fr.

"Bus 2 frs.

This "BAR-Lamb" concert was much appreciated, and the items as announced would have drawn a goodly audience anywhere.

Should any difficulty occur at any time in the way of maintaining good cross-channel duplex communications, owing to the instability of the land lines on either or both sides, it might not be amiss, where the extra land lengths proved available, to try the by no means new method of duplexing the cable section and utilising two land lengths on either side of the cable as two extended arms for receiving and transmitting respectively. This has been done with advantage on more than one occasion over Anglo-Continental lines of over one thousand miles in length. By this means the maximum output is obtained over the most expensive and most precious portion of the circuit. International and structural difficulties attend this suggestion, which is not the writer's, but the former could doubtless be overcome by the same persuasive means as those which so splendidly paved the way for the duplex itself. As to the second, the erection of a comparatively small building at the cable heads it has been definitely proved would amply suffice.

Perhaps two congratulatory words may be permitted in these columns. Firstly to that unassuming member of the Cable Room, Mr. Doran, who has been awarded the French military medal for some cool daring telegraph work in the trenches and upon whom it is understood other honours may possibly soon fall, and secondly to Mr. R. W. Hatswell, assistant editor of *St. Martin's le Grand*, upon the happy escape of his officer son from the ill-fated *King Edward VII.*

By the way *St. Martin's* has just completed its silver year of publication.

It is an annual custom in the foreign telegraph world to exchange New Year greetings between offices normally working direct with one another. 1916 was ushered in with a shoal of these amenities, all the allied countries expressing their firm confidence in the outcome of the present conflict, all unitedly bidding one another to have faith in the cause of justice and with patience and courage to carry through the work which they have set their hands to do, that courage which "consists not in blindly overlooking danger, but in seeing it and conquering it."

J. J. T.

SUPERVISION AS SEEN FROM BELOW.*

By S. A. COASE (C.T.O.).

For some time past my attention has been exercised by the spectacle of supervision and a consideration of its possibilities. I have endeavoured, at times, to discuss the matter in the office; but have found, with two exceptions, not criticism of my ideas; not hostility, but deadly lethargy. It must not be thought that the same indifference was evinced towards all subjects: for example I have ever found a smouldering hostility to the newer forms of telegraphy with their exacting demands upon skilled attention, and a sneaking regard for the old days of easy go. Their parallel existed till quite recently in the Navy, I am assured, in men who opposed innovations such as the Belleville boilers. They may be classed as the rowing-boat school and dismissed, with their jeremiads, from the contemplation of the future. The lethargy encountered with regard to supervision was not, then, any indifference towards the speaker, but with regard to the subject; and this was a symptom serious enough to stiffen my intention to ventilate the question, if an opportunity arose. Of the very few people, in a supervisory character, who listened to me, one was Mr. Tyrrell. He asked me to deal with the matter by means of a short paper. The title, taken almost at random, will suggest my standpoint and condone, perhaps, any faults of argument due to lack of experience. To confine myself strictly to the title, however, without examining cognate subjects such as promotion, responsibility and training, would be as impossible as it would be to describe a whirlpool without the water. Not that I consider supervision a whirlpool!

It was Napoleon, I think, who considered that the paramount duty of the controlling head was to choose his lieutenants ably; to give them sufficient forces; and, having done that, to exact results. Excuses and explanations were repugnant to this remarkable man, and he—almost typical of an unerring nature—did not tolerate the plea of bad luck. At the zenith of his career he would seek his lieutenants irrespective of social rank or mere length of military service. He thus tapped genius and energy, however obscure the source, wherever they could be found.

I remember one of Marryatt's characters speaks thus to a young colleague joining the service: "You're proud of your uniform now, and so was I when I first put it on; but you'll be sick of it before you put it off." I suppose we all—I am speaking of my class—were proud when first appointed. I know I was; but the years roll on; the situation becomes hopelessly monotonous, and—"what has this to do with supervision from below?" you ask.

Just this: that if any situation known to me requires boundless energy, it is that of telegraph supervisor. Constantly on the alert to cope with changing conditions, ever mastering—or shirking—the developments of advancing systems and keeping abreast with new ideas, the supervisor, although intellectually able, is but dead ashes without the necessary energy to give life to his work; and energy is nine-tenths of genius, I think.

I was discussing the matter with a man who had been passed over recently; a man of about 46. Said he—"—was promoted, I was not. Between you and me, he is the better man for the job now. He is younger and has had a 'cushion' job for some time past. I have been on 'rdx' 30 years, and—the iron has been taken out of me." I looked at him keenly and saw what iron meant. Purpose; resolution; energy; grit!

That some supervisors are too old when first appointed, and fail afterwards to get into the stride, is evidenced by their obvious desire to avoid trouble of any kind. The approaching pension seems to have subdued all things to a mellow tint, and their avoidance of bustle and conflict is in complete harmony with their mental attitude—but what of the work?

To get through the work somehow, anyhow, having no reasonable minima as to delay and staff required, so long as the end of the day arrive, appears to be their conception of service rendered. To me is conjured up the aspect of a tree whose leaves linger after their season has passed and by their persistence repress the else swelling bud below. The process is the converse of a critic may reply, since dying leaves are ejected by the competitive buds beneath. I think of the tree anyhow: this suffers and fatally, in time. Kindly note that I am only aiming at a section: I have no complaint against the greater number, by any means.

There are different exponents of supervision. I will endeavour to portray some of them as they appear to us who are below. First I would

point to the weak man who tries to hold with the hare and run with the hounds. He stands aimlessly at an eternal parting of the ways. He wishes to please the Department but endeavours always to discover the attitude of the staff first, and compromise matters. He is even afraid of a noisy subordinate; and the man who protests loudly enough usually secures his end. Were he to enquire closely he would find that the man who protests is always ready to walk up to the door of insubordination and then—push somebody else in. It has never occurred to him that a certain form of protest should be made together with payment, viz., when the work is done.

Generally, however, we despise the weak man. We mistrust his goodness, believing that he will always wrong us *in camera* if it suit his end. A supervisor who allows liberties from below, will never, we think, protect us if an attack be made upon our interests from above. Next there is the would-be strong man who uses the weight of his position to inspire fear, and emphasises this character by a loud voice, as though, forsooth, it is the noise of the gun and not the thing fired which commands respect. We fear most where we most respect, and it is the supervisor of knowledge and character; whose grasp of an emergency; whose farsighted preparations anticipate difficult situations; whose keen attention to detail makes him master of his work, who is the strong man. He does not live by rule alone, and realises that precedents are often false guides; nor does the negative satisfaction of not breaking a rule allure him. His attainments are positive. He seeks the underlying principle which is embodied, and knowing that adjusts it to the occasion much as a joiner, copying a sample door as a suggestion, models others according to circumstances, to fit particular openings. He does not rely too blindly upon his subordinates, since he is a past master of what they practise; and being able to detect any explanatory insincerity gets a true knowledge of things in course. He is definite and gives his orders with an air of finality, as though he has posted a letter; and you don't post a letter twice.

There is, next, the curious exponent of supervision who wants you to believe that his presence is indispensable. It is difficult for a critical mind to take this type at its own valuation. What would you think of a clock that required a man standing by to keep it up to time? Yet this man's indispensability suggests that his staff is disciplined and organised so lamely that he must stand ever by.

The foregoing case may evoke the retort that a supervisor's place is with his staff in his division as a captain's would be with his crew in his ship. Admitted; but what I combat is the idea that a supervisor is satisfactory because work proceeds better under his very eyes. Cannot it be understood that there are two types of men? The higher type is more ashamed of being in the wrong than afraid of the consequences. The lower type fears only the consequences to him. A supervisor of ability and character engenders respect and commands the following of the higher type, and these would literally colour at the remotest hint that they gave eye service only, or took advantage whilst the back was turned. The other type, which forms an insignificant percentage, is the only body ruled by the gentleman whose actual presence is so necessary; therefore he does not rule his division, but, rather, dragoons a section, not to mention the insufferable handicap he places upon the divisional output by his irritating arrogance. This man would be better away, since statistics of individual work properly computed would ensure better results; for there is one thing the slacker cannot humbug, and that is statistics. He cannot always plead exceptional circumstances: slowly, remorselessly, irrevocably these figures overtake him and expose him for what he is: a drag upon the Department, and an impostor towards his fellow-men.

I now approach a different type of supervisor—the popular supervisor. I may be cold and unresponsive to the dictates of mercy and sentiment; but, even whilst applauding this jolly good fellow, I feel a revulsion. Is it that I have known popular supervisors without sufficient ability to make an enemy and who trod on nobody's toes; is it that this good nature is but a defensive screen, evolved perhaps to deflect criticism from their worse than mediocre minds? Is it that these men preserve their appellations by benevolent eye-shutting to the bad work of subordinates, thus letting an unpleasant but necessary duty devolve upon their less popular but more straightforward colleagues. Perhaps it is this latter, for there is to me no more contemptible character than he who converts a dereliction of duty into a simulation of goodness. I consider such a man as I do the legendary highwayman who robbed one class to befriend another: a benefactor at anybody's expense but his own. Heaven forbid that I should shadow the reputation of a really noble man who discharges his duty with integrity; treats his subordinates with impartial consideration, and leaves the Service with the affectionate wishes and deep respect of all. No! I have my heroes, and he is one; but even this man must coldshoulder insincerity; snub the impostor; reprove the slacker. Otherwise, he has failed in his duty both ways—to the Department and to those men who are forced to an undue share of the work.

Accuracy should be the first principle in telegraphy, and the loose attitude of "that'll do" won't do here. A thing is either done properly or not. I should like to say that it is my settled belief that some outside telegraphic administrations sacrifice accuracy to speed, and it appears an unsound method to pursue.

The great task of supervision consists in keeping delay to a minimum. This principle particularly interprets telegraphy. The difficulty, perhaps, is to reconcile the two opposing principles of the C.T.O. These are mobility of staff and specialisation. The advantage of neither principle, viewed alone, requires commendation or elaboration. Any student of economics is aware that specialisation produces the master in his own sphere of activity, and that labour to be mobile must be commoner and less specialised. Then again, specialisation has its evils. For instance: a good Morse sender who does nothing else, becomes a master in that line, but runs greater risks from cramp, than another less continuously employed. It becomes, here, a duty to release

* Paper read before the Telephone and Telegraph Society of London on Dec. 14, 1915.

the pressure; thus the operator becomes mobile; or, in simple language, he is transferred to different work. But, the greater the variety of his work, the less specialised he becomes in any one branch. Now the arrangement of a staff, amidst the complexities and intricate conditions of our Department, requires ability of discrimination if the maximum efficiency is to be produced.

The demands upon supervision are, to my mind, so great that were a standard possible many would fail. The position, at present that of a monopoly, makes things very easy all round and conduces, logically, to laxness. There is at least the theoretical danger of being satisfied with indifferent results. "I used to get home, every time, with my horse," said the amateur jockey, "until the pros. competed." And that may be the position. The running is easy, for we make it ourselves, in the Government Telegraph Service.

But what of results? Are delays less than they were? Are the actual outputs larger?—and be it remembered we have faster instruments than of yore. I am not going to hazard any statement on these points. Yet if the answer be not satisfactory, surely there is one obvious course: searching enquiry and by a competent and courageous tribunal.

It is perhaps only fair to state the style of complaint made by supervisors, according to my own observation.

"I have not always sufficient staff to man the wires: how can delays be avoided?" "Why," continued the supervisor, "even the Jews could not make bricks without straw, and I am expected to go one better than a Jew." Although this complaint may be justified, the reflection may sometimes arise: why hasn't this work been disposed of earlier when men were available? Another trivial and obvious consideration is often overlooked; so obvious that I dare scarcely mention it. If a couple of minutes be wasted on a fully occupied wire every succeeding message is delayed two minutes more than necessary.

"Look at my staff!" said a supervisor, and a brief compliance revealed a number of really good men but insufficiently trained. It is the Department's duty to give a thorough training and to satisfy the insistent calls due to the rapid developments of modern telegraphy. This is a serious call of alarm. At present men are found on important circuits who are only able to deal moderately with the work. I venture to intrude, unasked and say, on behalf of the supervisors, that a higher standard is required for *debutants* in actual telegraphic manipulation: this applies equally to the case of *dirigeurs*, to whose case the Controller alluded at our last meeting.

Supervisors are not always supported in their complaints, and thus lose resolution? was the burden of one complaint. If this is so it puts the supervisor in an intolerable position: for position without power is surely the worst indignity one can suffer. I do not emphasise this point, since no actual facts ever came to my knowledge. At the same time, one in my position would scarcely hear such complaints.

I would express here the personal and almost proprietary pride shown by the servants of a Cable Company, where I stayed for a year. Jealous of the company's reputation for business methods, and proud of its accomplishments were all, from the magnate to the messenger. They all felt that they were the Company, and there was a professional instinct, becoming at times a business conscience, which electrified the working. I find no particular evidence of it in our Department; on the other hand the staff talk of the Department as though it were some remote conclave of mysterious gods. I believe if this professional feeling were developed, and the whole staff placed upon the footing of membership, a pride and responsibility would be evidenced which would make the duties of supervision less onerous.

Before concluding I must again refer to the so-called problem of promotion by seniority, as against promotion by selection.

A promotion is simply a vacancy to be filled—an appointment. Although the recommendation of good service in the past is a credential of exceeding value—a promise in deeds, be it said—and a certain guide to the Department, it should not supersede the principle of selecting the candidate who is better able to fulfil the duties of the new post than another. If a promotion be a reward then the candidate has been underpaid in the past. Let promotion be a goal but never a pension. Then again it is said that selection is never more than a theory, because of favouritism. This implies either that anybody can supervise, or that the work suffers should an incapable favourite be appointed. Should a high standard be demanded, however, and its attainment exacted from the selected man; and the persons recommending the appointment be held strictly responsible for their action, the evils of that system would be reduced to small proportions.

Imagine the case of an incapable man appointed to a position requiring the exercise of gifts which he did not possess. It would be cruelty; for his life would become a crucifixion. He would finally, if morally brave, implore release from his false position. I am disposed to fear that supervision is treated too lightly and too lightly entered upon; hence the possibility of abusing a system to which outside business men subscribe in the majority of cases.

Of promotion, Shakespeare has observed, with his usual profundity of meaning:—

"Tis the curse of service,
Preferment goes by letter and affection,
Not by the old gradation
Where each second stood heir to the first."

Some men are, it would seem, appointed to duties simply to fill a gap. "Where is the bridge over the gap," asked a traveller in Peru. "Oh," replied the native, "the bridge was rotten and better a gap than a rotten bridge."

Discipline sounds harsh; but it is philologically cousin to disciple. Call it discipling and get an idea of what the word can convey. It suggests the supervisor as one better than those below. It suggests teaching, leadership

and example. Although discipline in its cruder aspect may mean repression for those who deserve it; it offers on the other hand, for the worthy, encouragement, privilege and reward.

THE DEFICIT ON THE TELEGRAPHS.*

BY W. H. F. WEBB (C.T.O.).

TEMERITY and diffidence may be considered ill-mated companions on a dangerous expedition—yet I would have it believed that I am escorted by both in my small and perhaps forlorn attack on that great enemy of the Telegraph Service—the deficit which may be likened to a robber stronghold battenning unhindered on what would be otherwise a very prosperous province of the State.

Unhappily, deficits at the present day occupy the leading roles on the stage of history—deficits beside which our own too familiar instance becomes for the time practically contemptible. Yet I trust that the moment may never be considered inopportune for an attempt to vanquish what should be clearly recognised as the most formidable competitor of every officer whose destiny is linked with that of our telegraph system.

Deficits of course are only too common in everyday experience and often unpleasantly personal, yet I believe that the physical and individual effect of the telegraph deficit is not comprehended generally as it should be, probably because its pressure is so widely diffused.

There is a very prevalent notion that the great telegraph deficit is not real—that it is only a kind of Napoleonic bogey created by the Government to prevent rapid fortunes being made by the staff, but I am afraid that we cannot altogether deny the existence of the sinister reality.

There have been many contributory elements to the constant growth of these insatiable liabilities, and I venture to think that some of the chief of them cannot be considered as complimentary to the powers—that have been!

The foremost blunder was the overwhelming generosity of the Government of the day which paid for what was in very truth the first of our national assets. It is a curious fact that until then the British Government was not the actual proprietor of any business, and its inexperience allied with a curio-collector's determination to acquire the telegraphs at any price, perhaps led to the bad bargain which was made, that is, bad from the taxpayer's point of view. So far as I have been able to gather the purchase price was somewhere near £7,000,000, but many authorities since then have agreed that at least £3,000,000 too much was paid for the system. This, at any rate, was a remarkable reversal of the policy of the Government of 1823 which, on being offered the rights of Sir Francis Ronald's electric telegraph system, replied officially that "the telegraph was of no use in times of peace, and that the semaphore in time of war answered all the required purpose." A diagram of the apparatus on which the Admiralty relied is shown in Figs. 1 and 2. Be it observed that all the original telegraphs depended upon the telescope. It is recorded with pride that 27 telegraphs of this type conveyed information in 3 minutes from Calais to Paris, 22 from Paris to Lille, 46 from Strasbourg to Paris in 6½ minutes and 80 from Paris to Brest in 10 minutes. But for this astonishing dictum, which died a lingering death during the following forty odd years, it is certain that the principal handicap of the successful systems which were combined under State ownership in 1870 would have been obviated.

Yet for some strange reason inventors have rarely been on good terms with Governments, although Governments would appear to have every reason to appreciate inventiveness!

Soon after purchase there were about 100 telegraph stations and a sixpenny tariff for London and a total of 2,932 telegraph offices throughout the country. At the transfer the headquarters of the telegraphs was in Telegraph Street—T.S. In the provincial room there were over 160 circuits fitted up principally with the Morse and Bell instruments and a staff of 426 male operators. But it is also noteworthy that the Hughes' instrument was in use and described as most perfect in its mechanical arrangements. It was in use to Holland, Belgium, France and Germany—the Dutch and German cables belonging to the Government, but leased to the old Electric Telegraph Company. The Metropolitan section was "manned" then as now by women, and the female staff numbered about 640. A very keen observer of that day expresses his astonishment at the silence in the Metropolitan room but for the clicking of the needles, and states the official opinion that in telegraphy a most suitable career for the ladies had revealed itself. He discounts this a little later by recording that only men are used in the foreign circuits on account of their greater fluency of language—foreign language. A skit of the period was that the sewing needle had been reduced to the rank of second favourite. Incidentally it may be stated also that in calling a distant station on one of the earlier needle circuits, where there was no such device as selective ringing, intermediate stations received all the calls and had to pick out their own. It was noted that at a certain rather quiet office when the operator had succumbed and gone to sleep his well-trained terrier always averted delay by waking him up whenever his call was received!

However, in two years from the transfer there were over 5,000 offices at work and our present C.T.O. was approaching completion. About £4,000,000 had been expended on these extensions, and as a matter of fact from that moment onwards no less a sum than £13,000,000 has been

*Paper read before the Telephone and Telegraph Society of London on Dec. 14, 1915.

voted for extensions, sites and buildings. Noting that Mr. Scudamore in his proposals to Parliament had promised a telegraph communication for every 2,000 inhabitants, it is easily realised that very acute efforts were needed to make a bare dividend or even to keep level with expenditure.

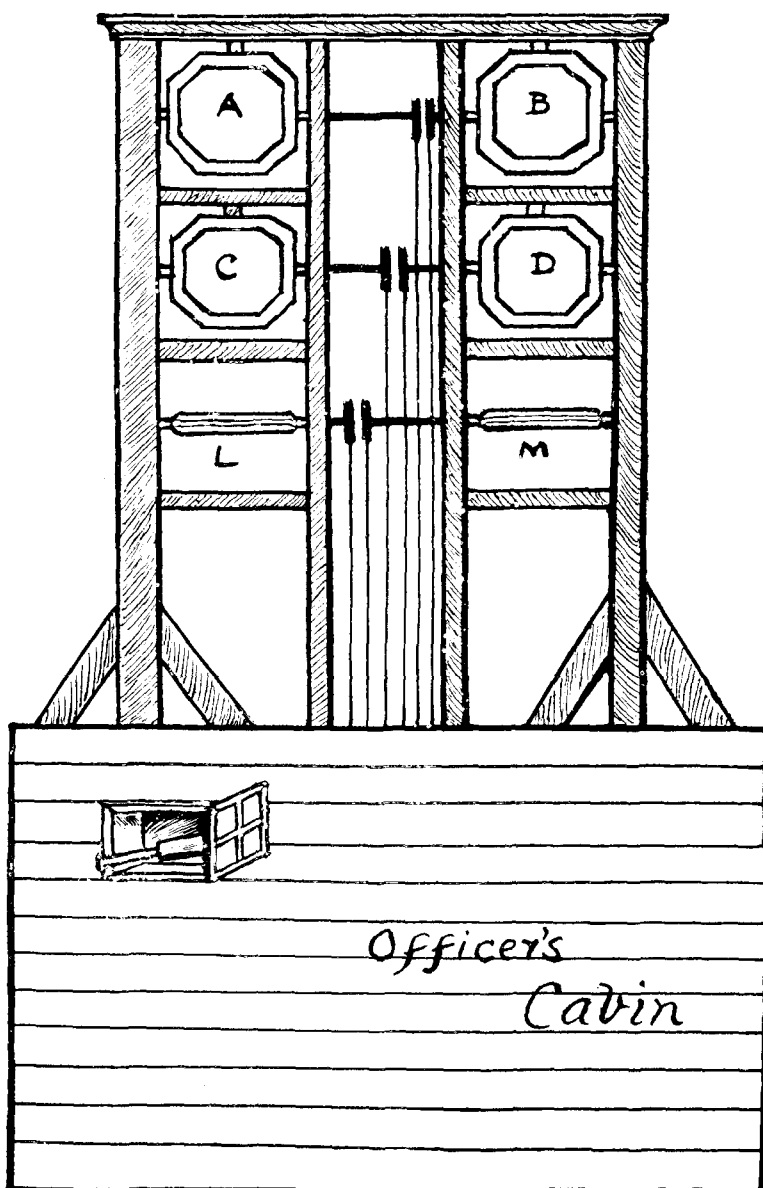


FIG. 1.

And here, next to the original over-costly transfer, we may discover another reason for the deficit which was soon adumbrated by the diminishing ratio of profits to expenditure. In order that everybody should have the telegraphic facilities which the Government had promised, it was inevitable that in many places it could not be made to pay. Year after year, in spite of rapidly increasing traffic, there was a decreasing surplus on the telegraphs until, in 1885, it was decided under pressure to reduce the tariff to a sixpenny minimum. A great boon to mercantile interests, this might have saved the situation had there been the requisite 300 per cent. increase of traffic, but as a matter of fact such a figure has never been reached. Within two years the traffic rose by about 50 per cent., and in six years from the reduction by about 100 per cent. But at this period a new and formidable competitor arrived in the guise of the telephone, and so powerful a rival were the National Telephone Company's trunks, that in 1896 the Government took them over and consolidated the foundations of the State telephone system. Perhaps I might be here permitted to interpolate a personal note and to state that with a few other colleagues, we were familiar with those telephone trunks while they increased from about 20 to nearly 200 in number. But many of those very trunks are responsible for a portion of our telegraph deficit in that they were built and maintained from the various telegraph votes passed between 1880 and 1896, and it may be reasonable to enquire whether this portion of our liabilities should not be assumed by the telephones? It is also stated that house room provided for the telephones by Post and Telegraph offices has in many cases not been debited to the telephones, but the point is that but for the existence of the Post and Telegraph offices in question house room would have had to be found and paid for. It has been

admitted that there is great difficulty in fixing these apportionments, but, after all, the burden of the Telegraph Service should be lightened by some compromise between nothing and otherwise inevitable expenditure for accommodation. Before leaving this subject of telephone indebtedness to the telegraphs, another question may be asked—whether, in the event of the occasional conversion of an overhead telegraph route to underground, and the subsequent acquisition of the aerials by the telephones—which I understand has happened—the telegraphs have been credited with the value of the transaction?

A curious fact has emerged from an examination of national telegraph systems, and that is the twin-like inseparability of telegraph and telephone finance—in many cases further complicated by inclusion in Postal and even Railway returns—in which cases, of course, investigation has been fruitless. But I have sought to make enquiries specifically relating to the telegraphs in 25 countries, and have discovered from their accounts that ten administrations, at least, have to report a deficit. This provides an instance, where, without any elation, we must confess that Great Britain leads the way! It is difficult in the extreme to trace all the reasons for these deficits, but one which is universally applicable is "governmental obligation"—the irresistible claim of the peoples to an essential accompaniment of modern life—rapid communication, national and international.

Another reason is the necessity in many countries for carrying the lines across large and thinly populated areas where a telegram would be as rare as strawberries within the Antarctic circle!

I have managed, with many enquiries, to collect a few particulars only of the various internal tariffs which are at least interesting, and are set out in Fig. 3.

Another reason is that the best historical example of telegraph construction remains unique, and has never won the flattery of imitation: I refer to the system of Switzerland. It was constructed by the spontaneous

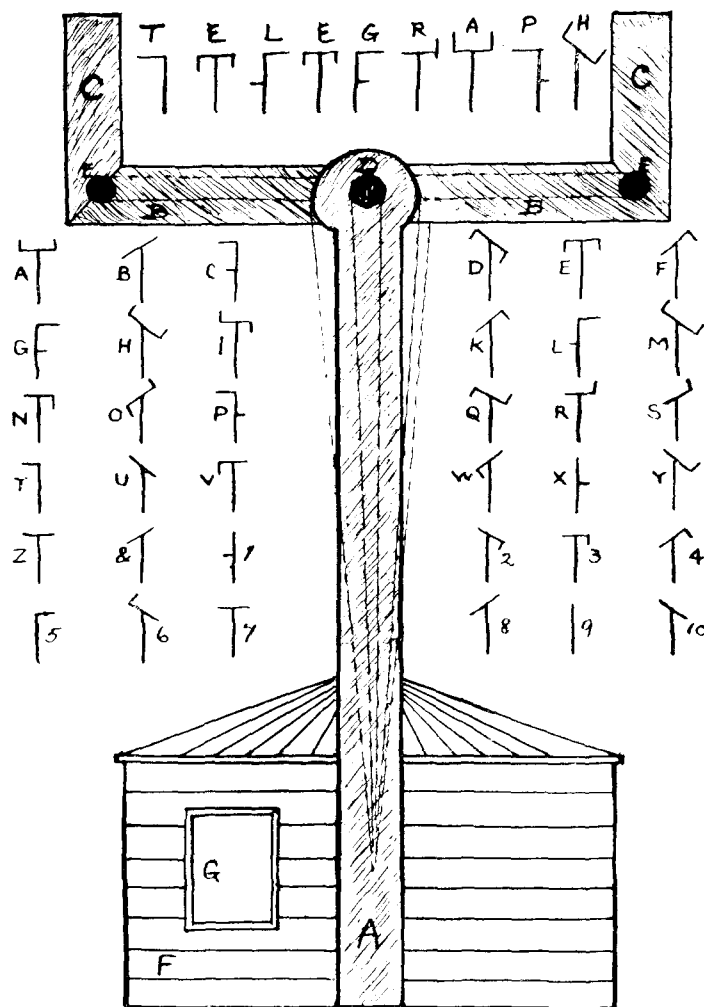


FIG. 2.

efforts of the people—"the peasants gave their labour in erecting wires and poles, the landlords found the timber and the wayleaves and the communes provided station room in the towns." And further, like the great wall of China, it proceeds regardless of the nature of the ground! The most remarkable portion of this statement is that relating to the landlords—there must be unheard-of elements in the mountain air!

Another reflection that arises in connexion with the deficit is a query whether, in the endeavour to cope with the traffic expeditiously, there has

not been over-production of the machinery of the telegraphs? There must naturally be some reserve, but the percentage of time during which a vast amount of apparatus remains idle arouses curiosity and I think is worth investigation. Idle machinery like idle hands earns nothing, and maybe our deficit has obtained nourishment even from this item.

Another consideration worth notice is that although for the past ten years telegraph traffic has been practically stationary, the number of telegraph offices has been increased by over 1,000 and the deficit by over £8,000,000!

Up to date the accumulated "loss" amounts to about £25,000,000, of which nearly £7,000,000 represents interest on the various loans which have expanded the system, and the balance of £18,000,000 represents extensions, sites and buildings. It is only fair to assume that a great struggle has been made to reverse the two sides of the telegraph account, but neither the lure of the public by a lower tariff nor the cheapening of labour or any expedient has availed the authorities against what amounts in effect to an industrial or mercantile subsidy. I am not too hopeful that the telegraph ledger may ever rival that of the commercial interests which have been so largely responsible for the forced sale of produce—telegrams—below cost, but there is decided ground for optimism in a survey of national and international telegraph traffic. In every case which we have glanced at there is firm and not inconsiderable increase, and, after all, a business embracing the collection and despatch of over 80,000,000 telegrams per annum, with receipts of nearly £4,000,000, would be by no means beneath the attention of even an American oil king or an English coal magnate!

It is not possible by these few strokes of the pen to correct the blunders which have admittedly been made, but with all deference I put forward one or two suggestions whose defence must be their sincerity and a conviction that the prosperity of our great business would not be confined solely to the Administration but would be to some sure extent shared by its creators.

1. I would repeat the suggestions already hinted *re* the need for a new diagnosis of the accumulation of material, prime cost and establishment charges—a closer watch on the waste of light, power and stationery, and the finer adjustment of telegraph and telephone relations.

2. Increased charges for telegrams inevitably mean decreased "consumption," but there can be no hesitation about the wisdom of the step. With no desire to be hypercritical, the popular minimum fee of 6d. might have been retained for a message of eight words—9d. for 12, and 1s. for 16, with a ½d. rate for every word thereafter.

3. Regarding night telegraph letters—too little advertised—I would propose that permission be given to *post* these at any pillar box or post office between 7 p.m. or 8 p.m., and midnight or 1 a.m., on forms ready stamped from 1s. minimum, or if accompanied by a postal order payable to the Postmaster-General—or on the present deposit account system—the Postmaster-General and stationers supplying at option special night telegram envelopes.

4. A threepenny urban telegram service within all town limits.

The stagnation of traffic growth leads one to suppose the Service to be at present in a state of flux—sensitive to any powerful directive impulse towards prosperity or decay. There are, of course, many other points in actual working which could be submitted to modification, and there are momentous issues from a Service point of view which would involve attack upon well-entrenched sinecure positions.

5. I take it that the essence and motto of the Telegraph Service is—dispatch!

It is therefore impossible in seeking remedies to burke consideration of the two most potent factors of all in our business—time and *personnel*. In the commercial world a great concern in similar conditions to our own would have at work upon and in it the highest qualities of the required character, and, at present, when the war has forced the necessity for re-organisation and retrenchment into opportune prominence, only weakness would fail to tackle those factors. Urgent necessities invoke urgent expedients, and special difficulties demand special efforts. I venture to ask the Administration whether it is satisfied that the telegraphs have the best available staff? It is an axiom that the output of a telegraph circuit depends on KR. This is true, but stronger than the electrical KR law is the KR of the circuit operators, which is actually the KR of the slower man. "The speed of a squadron is the speed of the slowest ship." To illustrate this let us take two cases—nine operators at 50 per hour, and one at 30—the average per operator per hour will be 48. If we reverse the positions and take one operator at 50 and nine at 40, we find an average per operator of 41 per hour. In either case it will be noted that the height of the average output depends on the superior operators, and that the better operators are mulcted of their due. The "average system" is anathema in certain circles, but it is impossible to see upon what other basis for general fairness the Administration can appraise the work performed. Representative annual returns give a mean average of about 21 messages per operator per hour. If this figure could be raised by only one message per hour, a saving of nearly 24,000 working days per annum and of over 70 appointments could be effected. It therefore appears to be true to state that the expert operator suffers heavy depreciation from the average system, and that the Department, by the absence of sound remedial measures, is content with a lower standard output per operator than that which is attainable and insisted upon elsewhere in the telegraphic world. I suggest that the final condition of permanent employment in the Telegraph Service should be a higher, more expert degree of manipulation, and that to the stimuli of the double and technical increments should be added that of a wider financial gap between the various grades of officers—even if the maxima remain unaffected. Very trite old sayings are those—that "the race is to the swift" and that "slow and sure wins the race," but telegraphically at any rate neither is true at present, and a more apposite maxim would be "selection improves the race!"

SURPLUSES.			DEFICITS.		
	Rate per word.	Minimum.		Tariff.	Minimum.
BELGIUM ...	$\frac{1}{3}$ d.	15 w. 5d.	AUSTRIA ...	—	—
BULGARIA ...	—	—	AUSTRALIA—		
CANADA (Companies)	—	—	$\frac{3}{8}$ d. Urban		16 w. 6d.
EGYPT ...	—	—	$\frac{9}{16}$ d. State		„ 9d.
GERMANY ...	—	—	$\frac{3}{4}$ d. Interstate		„ 1s.
INDIA ...	$1\frac{1}{4}$ d. Express	12 w. 1 R.	BOLIVIA ...	—	—
	$\frac{1}{2}$ d. Ordinary	12 w. 6 a.	BRAZIL ...	—	—
NEW ZEALAND	$\left\{ \begin{array}{l} 1d. \text{ Urgent} \\ \frac{1}{2}d. \text{ Ordinary} \end{array} \right.$	$\left\{ \begin{array}{l} 12 \text{ w. } 1s. \\ 12 \text{ w. } 6d. \end{array} \right.$	CANADA (State)...	—	—
NORWAY ...	—	—	FRANCE ...	—	—
RUSSIA ...	—	—	HOLLAND ...	—	—
S. AFRICA (Cape)	1d.	12 w. 1s.	ITALY ...	—	—
SWEDEN ...	—	—	SPAIN ...	—	—
U.S.A. (Companies)	—	—	UNITED KINGDOM	$\frac{3}{4}$ d.	12 w. 9d.
BALANCE.					
SWITZERLAND ...	...	$\frac{1}{4}$ d. per word	...		12 words 3d.
JAPAN ...	$\left\{ \begin{array}{l} \frac{3}{4}d. \text{ per word for Europeans' messages} \\ \frac{3}{4}d. \text{ per 5 wds. " Native} \end{array} \right.$				No balance sheets.
CHINA ...	$\left\{ \begin{array}{l} \text{Most expensive in the world} \\ \text{...} \end{array} \right.$				

FIG. 3.—NATIONAL TELEGRAPH SYSTEMS.

If applied there would arrive an improved supervision. A clever staff does not require "spur" supervision, which nowadays less than ever can achieve the best results. A mediocre staff is the school for mediocre supervisors, and higher rank makes a very poor working substitute for ability. Capacity above and below is as essential to efficient working as rails to the locomotive.

If working pressure—productive pressure—be mutual and not antagonistic the resultant absence of friction means redoubled advantage. From machinery we may expect something like mathematical accuracy, which is inherent, but from men something less on account of certain intractable factors. Supervision makes an imperative demand for genuine qualities—merely painting the lath will not make it iron!

In criticising I act with all respect upon a variation of the well-known dictum—"All is not of the best in the best of all possible services."

After all, however, we may conclude that the great deficit is not all deficit, the major portion is a bogey, it is capital expenditure and most distinctly represents assets, but at the present time something like a return of 14 per cent. on expenditure is required to work the telegraph without loss.

The deficit then is a very real dragon calling for a St. George, and until the latter's arrival and victory I will dare to hope that it may be possible at least to keep the creature on starvation rations, and that the Cinderella of the Services—or is it the prodigal daughter?—may even yet re-enter the charmed circle from which she has been too long an exile.

PHONOGRAMS.*

By B. R. MEAD (L.T.S.).

QUITE recently I was asked by an officer of the C.T.O. why the London Telephone Service is of opinion that the Phonogram Room should be staffed and controlled by the Telephone instead of by the Telegraph Administration. It occurred to me, therefore, that the subject would be a suitable one for review in a short paper before this Society. I have accordingly endeavoured to sketch the history of the Phonogram Service in London during the last few years, and to assemble some items which support the view that division of control at the point where it now obtains, does not make for the greatest efficiency of the Phonogram and Telephone Services.

Phonogram traffic, as you are probably aware, consists primarily of telegraph messages sent or received by telephone subscribers—the outward messages being dictated over the telephone to a telegraph office for onward transmission, and the inward messages being dictated in similar fashion from the terminal telegraph office. Phonogram facilities are also utilised for the transmission of telegrams by telephone between two post offices; such messages being known as "Telephone-telegrams."

Connexions set up for the purpose of transmitting either phonograms or telephone-telegrams, may involve the use of telephone trunk lines as well as junction circuits.

The question which calls for early decision when considering the establishment of a phonogram service for any area is the point to which the

* Paper read before the Telephone and Telegraph Society of London on Dec. 14, 1915.

Gell Telegraphic Appliances Syndicate, Limited.

ON WAR OFFICE, ADMIRALTY, POST OFFICE, CROWN
AGENTS, AND OTHER COLONIAL ADMINISTRATIONS
LISTS OF CONTRACTORS.

SOLE MANUFACTURERS OF THE

GELL KEYBOARD PERFORATOR.
GELL Motor - Driven Transmitter.
GELL Motor - Driven Receiver
for Morse and Cable Wheatstone working.

Also Manufacturers of

**LANDLINE, CABLE AND WIRELESS
TELEGRAPHIC APPARATUS.**

Registered Offices:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Sardinia House, Sardinia Street, Kingsway, W.C.
Telephone: Holborn 6826.

Works:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Pine Grove Works, Tollington Park, London, N.
Telephone: North 1196. Telegrams: "Gelltas, London."

Important New Book.

Automatic Telephony

*A Comprehensive Treatise on Automatic
and Semi-Automatic Systems*

By ARTHUR BESSEY SMITH, E.E.
Member A.I.E.E., formerly Professor of Telephone Engineering,
Purdue University,
AND
WILSON LEE CAMPBELL, E.E.
Fellow A.I.E.E.

406 pages, 6 x 9, illustrated

17s. net, postpaid

See our Advertisement, January issue, page IV.

CONTENTS.

CHAPTER

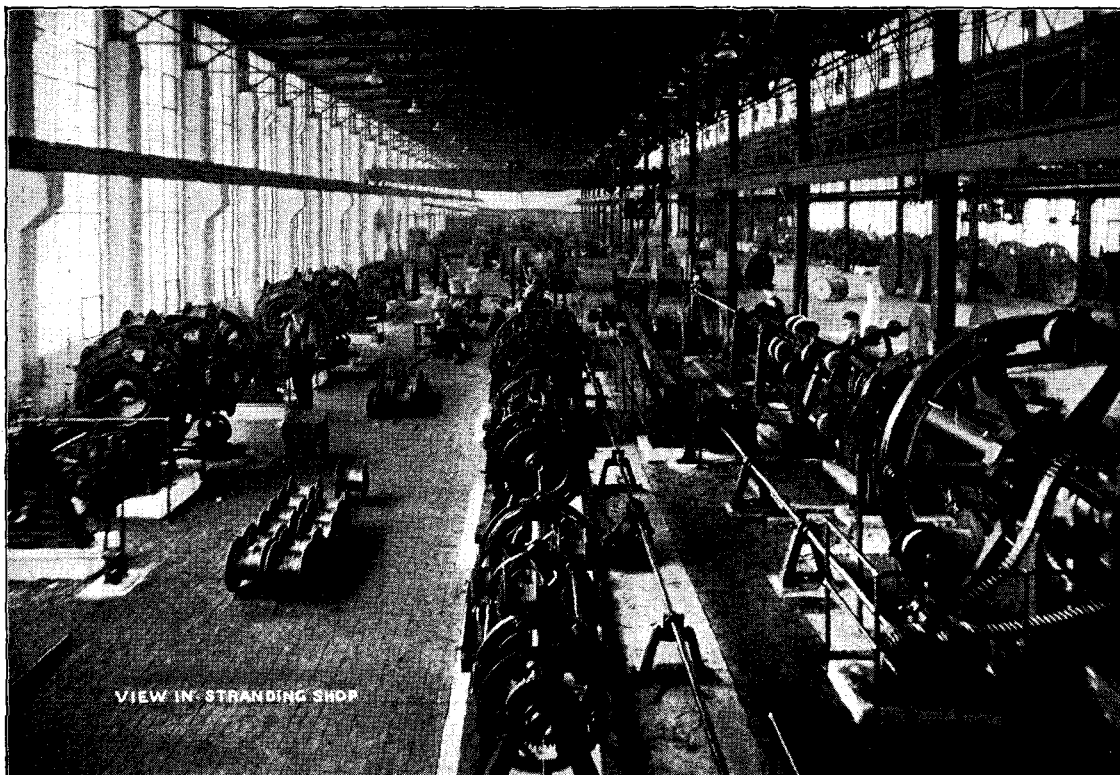
- I.—Trunking.
- II.—Automatic Electric Company's Switchboard Apparatus.
- III.—Subscribers' Station Equipment for Use with Automatic Electric Company's Two-Wire Systems.
- IV.—Measured Service Equipment.
- V.—Automatic System of the American Automatic Telephone Co.
- VI.—Siemens and Halske System.
- VII.—The Lorimer System.
- VIII.—Automatic Traffic Distributor Equipment.

CHAPTER

- IX.—Automatic District Stations.
- X.—Clement Automannual System.
- XI.—The System of the Western Electric Co.
- XII.—Long Distance, Suburban and Rural Line Equipment.
- XIII.—Cutovers and Interconnections of Manual and Automatic Offices.
- XIV.—Power Plant, Supervisory and Testing Equipment, and Circuits.
- XV.—Traffic.
- XVI.—Development Studies.

HILL PUBLISHING CO., LTD.,

6 & 8, BOUVERIE STREET, LONDON, E.C.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

Neverstick FILING DEVICES



Meet the needs of all Businesses, Trades and Professions. None too large and none too small. Our devices are all arranged on the Building-up System, so that you can start with sections for your requirements of to-day and add others as needs arise.

Has it ever occurred to you the amount of time that is wasted in waiting for letters or documents that have to be found when wanted, instead of being filed so that they can be had instantly?

Our "IDEAL" indexing system overcomes this waste of time.

Let us send you particulars together with our Catalogue containing 60 pages of Ideas, post free.

The Drawers are guaranteed never to bind or stick in any climate. They have Roller Bearings and can always be opened with the little finger.

Write NOW whilst you think of it

SHAW-WALKER, LTD.,
33, ST. BRIDE STREET, LONDON, E.C.

Silk and Cotton-Covered H.C. Copper Wire,
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
"ORMISTON, LONDON." 13259 CENTRAL.

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.

CIVIL SERVICE Share Purchase and Investment Society, Ltd.

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year.	2 Years.	3 Years.	5 Years.	7 Years.	10 Years.
17s. 5d.	9s. 1d.	6s. 3d.	4s. 1d.	3s. 1d.	2s. 5d.

Stocks and Shares bought or sold through the agency of this Society.

Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society exceeds the sum of £500,000.

THE Telephone Rendered Audible under Gunfire

BY THE USE OF

MALLOCK-ARMSTRONG Patent EAR DEFENDERS.

(MR. A. MALLOCK, F.R.S. & SIR W. G. ARMSTRONG, WHITWORTH & CO. LTD.)

SMALL SOUNDS ARE PRESERVED.

WHEN WEARING THE DEFENDER THERE IS:—

NO TEMPORARY DEAFNESS, NO LOST TIME,

NO MISUNDERSTANDING.

IT IS WORN IN COMFORT UNDER THE RECEIVER OR GAS HELMET.

CONSTRUCTED ON ACOUSTIC PRINCIPLES.

Supplied to
every Ship in
H.B.M. Navy.



Involves no
inconvenience
to the wearer.

Remove the
Defenders from
the Clips and
place one in
each ear.



In Metal Pocket
Case with
"Safe-find"
Rubber Clips,
as illustrated,

4s.

Per Pair.

Post Free,

4s. 2d.
with full
particulars.

Many
thousands
already in use
in the
firing line.

Indestructible.

From Stores, Outfitters and Surgical Instrument Makers, or from:—
MALLOCK-ARMSTRONG EAR DEFENDER CO.,
FACTORY: 5 CARTARET STREET, WESTMINSTER.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital).

Telephone: 1309 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3s. 6d. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

	PER PAIR
Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses	8. d. 3 6
Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames	7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE, WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

subscriber shall dictate his message. Factors entering into this consideration are :—

- (1) Transmission must be good over the telephone route selected.
- (2) Facilities must exist for the expert handling of the messages both telephonically and telegraphically, and
- (3) The message should reach the Telegraph Department at that point where it can be handled economically and transmitted with the least possible delay.

So far as phonogram traffic within the London Postal Area is concerned, the Central Telegraph Office is the appointed office at which the Telegraph and Telephone Services meet. Telegrams were telephoned to the C.T.O. before the Post Office had developed on a large scale a telephone system of its own. When the telephone facilities in London were mainly provided by the late National Telephone Company the Post Office had practically no alternative but to draw on the telegraph staff for officers to transcribe the messages at the subscriber's dictation. During transmission as a telegram the phonogram shares the telegraph facilities in common with all telegrams.

The phonogram connexion is only one of the various kinds of call which the telephonist has to set up, and the ideal condition to be aimed at is the complete fusion of phonogram and purely telephone traffic, by using the same organism in the same way, as far as possible, for both. This ideal demands that while the standard conditions governing the telephone traffic shall admit of facilities affording an efficient Phonogram Service, the phonogram traffic shall not unduly interfere with the efficiency of the Telephone Service as a whole.

The busy periods of phonogram traffic *outgoing* from the Central Telegraph Office to the subscribers, occur normally when telephone traffic is below the peak. The ordinary telephone organism is therefore available, and can provide adequately for distributing this traffic. The flow of traffic incoming to the C.T.O. coincides more closely with the normal flow of telephone traffic proper. This incoming traffic is, as already stated, composed of calls made for the purpose of dictating telegrams for onward transmission. More work is involved in this transaction than is represented in the delivery of a message to a subscriber by telephone. It is this portion of the phonogram traffic which has required the most attention from the controlling Departments.

The phonogram junctions terminate at the C.T.O. on a "Distribution" or "Concentration" Switchboard, from which point they are extended manually to the stalls at which operators deal with the subscribers. The "distribution" operator does not speak on the line, her function is simply to connect a disengaged stall.

The existing "Distribution" Board at the C.T.O. was installed in July 1913. It embodied several improvements on the former board; improvements made at the suggestion of the L.T.S. Telephone equipment and operating procedure were about that time becoming more and more standardised, and particular attention was directed to the speed and efficiency of the telephone service afforded to the public. C.B. switchboards with automatic signalling were the order of the day, and by careful tuition, adequate supervision, strict discipline, "listening in" observations, test calls, and a healthy rivalry between exchanges, the telephonist was being trained to render a high standard of service. The standard C.B. telephone set had replaced to a considerable extent the older magneto instrument, with the result that the subscriber was unconsciously contributing to the increased efficiency of the general service. It is therefore not surprising to find that much correspondence between the Telegraph and Telephone authorities during the past few years has resulted from efforts to raise the standard of the Phonogram Service in order that it might be more uniform with contemporary telephone traffic.

Some of the difficulties experienced were consequent upon the use of the phonogram junctions for traffic outgoing from the C.T.O. as well as for incoming traffic, and in December 1913 recommendations made by the L.T.S. resulted in the segregation of the stalls and the establishment of separate incoming and outgoing junctions.

Two weak features of the service from the telephone traffic point of view, were the average time of answer by the C.T.O., and the delay in clearing at the conclusion of the message. Observations conducted by the L.T.S. in May 1915 revealed the average time of answer as 49.6 seconds, and according to records taken at various exchanges in April 1915 the average intervals which elapsed between the receipt of the subscriber's "clear" and the Phonogram Room "clear" varied between 25 seconds and 98 seconds as observed at Gerrard and North Exchanges respectively.

The Trunk Exchange Record Distribution Board provides facilities for traffic similar to that incoming to the Phonogram Room. In comparison with the figures just quoted one finds that the average speed of answer by the Trunk Exchange record telephonist is about 5.5 seconds, while the time taken to give the "clear" to the trunk distribution board is 3.97 seconds. The circuit arrangements of the trunk distribution board have the advantage that the record telephonist who corresponds to the stall operator, is automatically in circuit as soon as the calling line is extended at the board, while the phonogram stall operator cannot take a call put through to her until she has placed herself in circuit by means of a speaking key. This feature of the phonogram stall equipment doubtless accounts in some measure for the high answering time. The bulk of the difference between the trunk record operator's time of clear and the C.T.O. clear is probably accounted for mainly by the extra work involved in checking, counting and coding the telegram ready for circulation to the normal telegraph channels.

Although the stall operator thus delays furnishing a clearing signal to the "A" operator on the calling cord supervisory at the originating exchange, the calling subscriber has in many cases given a signal on the answering supervisory. It is standard telephone practice where an "A" operator receives only one supervisory clearing signal, to wait ten seconds and then to enter the circuit and challenge before clearing. In the case of calls to

"phonograms" there is no reason apparent to the "A" operator why phonogram connexions should be maintained after the calling subscribers have cleared, so she clears in these cases on the single supervisory. The result is that the phonogram junction tests free for another connexion although it is still plugged up at the C.T.O. The prolonged retention of a line by the phonogram stall operator reduces the traffic capacity of the junctions.

Where telephone trunk lines are involved, any undue holding of the connexion represents a loss of operating and revenue-earning time proportionate in value to the length of the trunk line used.

So far my points have dealt with the adverse effects which the conditions at the C.T.O. have had on the Telephone Service. It is equally true, however, that certain circumstances incidental to the Telephone Service have adversely affected the Phonogram Room. This close inter-relation of the two services has led to the view that both would benefit by an alteration in the point of the division between the Telephone and Telegraph control, the new division to be such that telephonists would deal with the message during the whole course of its transmission over telephone channels. It is suggested that telephonists should have charge of the phonogram message up to and including its transcription at the subscriber's dictation, thereafter handing it over to the telegraph staff. It is understood that this procedure obtains at most of the larger provincial towns. It has certain definite advantages, amongst which are :—

- (1) Uniform control covering the complete "telephone" stage, thus facilitating the tracing of delays, difficulties and complaints.
- (2) A lower wages bill. The telephonists scale of pay being less than that for telegraphists.
- (3) An increased efficiency in matters telephonic, as telephonists are selected with regard to clearness of speech and freedom from marked peculiarities of accent. They are specially trained to respond to all demands with

Celerity,
Clearness,
Correctness and
Courtesy.

Moreover, telephonists being well acquainted with exchange operating procedure, can, if occasion arises, render assistance to a subscriber or to the exchange staff.

The training in elocution which telephonists receive, and the keen sense of hearing developed by continuous listening to various qualities of speech, constitute a valuable factor where long junction and trunk connexions are involved.

Telephonists have been employed in the Phonogram Room during the last few months as an emergency measure, and observations taken over various periods in May, August and October last, reveal a gradual improvement in the general service, as the following figures show :—

Period.	Staff at phono- gram stalls.	Average time taken by C.T.O. to answer, Seconds.	Calls		
			answered in 30 seconds or less.	answered in 45 seconds or less.	Calls abandoned.
			Per cent.	Per cent.	Per cent.
May 1915	Telegraph	49.6	51	61.2	6.5
August 1915	Telephone	35.8	67.3	75.9	4.6
October 1915	„	27.3	76.3	85.1	2.4

It will be seen that the time taken to answer calls has improved appreciably, and has had a corresponding effect on the percentage of abandoned calls. The number of cases of difficulty in hearing has fallen off considerably since the phonogram stalls were staffed by telephonists. The figures are :—

May 1915 (telegraphists) C.T.O. unable to hear 7.1 per cent. of the messages.

August 1915 (telephonists) C.T.O. unable to hear 3.9 per cent. of the messages.

October 1915 (telephonists) C.T.O. unable to hear 3.4 per cent. of the messages.

May 1915 (telegraphists) subscriber unable to hear .99 per cent. of the messages.

August 1915 (telephonists) subscriber unable to hear .39 per cent. of the messages.

October 1915 (telephonists) subscriber unable to hear .15 per cent. of the messages.

One hears of phonetic and spelling errors made by telephonists in the Phonogram Room, but we are not without parallel instances from the telegraph staff.

It is understood that one outstanding feature since the introduction of telephonists to the Phonogram Room is the reduction in the maintenance of apparatus used at the stalls, resulting from the fact that the telephonists wear head-sets while the telegraphists generally insist on using table-sets.

It may be urged that the officer accepting the message from the public must be in a position to satisfy herself that the message as dictated complies with the telegraph requirements, and that a telephonist has not the knowledge of the telegraph regulations and routine necessary for the satisfactory accomplishment of this duty. Counter clerks, however, are not always telegraphists. Moreover telegraph messengers, and I believe rural postmen, accept telegrams from the public and bring them to the telegraph office.

The telephonists employed in the C.T.O. Phonogram Room should now be approaching the stage when they will have learned by experience the particulars necessary before a phonogram message complies with the telegraphic requirements. It is obvious that after the message has been transcribed some degree of checking must be carried out before the subscriber is allowed to go out of circuit. The message thus accepted must then be initialed and the

time of receipt recorded. These two items, however, need occupy but a very little while even if the time code is used. The counting and pricing of the message should be done at another point, if need be by a telegraphist, but not by the stall operator.

The telephonists in the Phonogram Room are at present supervised by officers of the telegraph staff. The ratio of supervisors to telephonists is below that adopted as standard for the Telephone Service, and it is considered that the maximum benefit derivable from the staffing of the stalls by telephonists will not be obtained until the standards of supervision and discipline found necessary for telephone exchanges obtain in the Phonogram Room.

Time has not permitted me to go as fully as I would wish into some of the foregoing items, and the points which I have selected concern mainly equipment and operating. If I conclude with a reference to the controlling departments, I would submit that where telephone facilities are involved the Telephone Service, by reason of the specialised knowledge which it commands, is in the most advantageous position to direct those facilities in the best interests of the public and the Telegraph and Telephone Services.

Mr. J. Bailey (C.T.O.):

I should not trouble the meeting with any comments on this paper except for the fact that its having been read here might lead those not closely acquainted with the working of a phonogram room to place too much credence on the statements presented by Mr. Mead, who has outlined his own points of view without regard to actual working conditions.

The distribution board that is said to have embodied several improvements made at the suggestion of the London Telephone Service, was out of date and antiquated when it was erected and had to be considerably modified at the instance of the Central Telegraph Office. Its principal drawback was the unsatisfactory method of clearing which resulted in subscribers, who had just been put through, being cut off before connexion could be established with the stall operator. The trouble was due to the fact that when the stall operator and the subscriber cleared, the clearing signal did not appear on the phonogram board until the distant exchange cleared to the Central Telegraph Office. The result was that the exchange cleared the connexion and joined another subscriber to the stall operator who was still clearing from the previous subscriber; and the second subscriber was practically disconnected on the clearing signal for the first subscriber. Hence the delay, confusion and repeated complaints from the irate subscribers. Thanks to the insistence of the Central Telegraph Office the stall operator's clear now appears on the phonogram board, and the modification has resulted in smoother and quicker working.

The segregation of the stalls and the establishment of separate incoming and outgoing junctions is not new at the Central Telegraph Office. That system has obtained on the intercommunication switch for the last ten years and would have been introduced on the phonogram board at a considerably earlier date if the Central Telegraph Office authorities had had any control over it.

The improvement in the average time of answering and clearing has been brought about by the change in the method of clearing and not by the introduction of telephonists. The comparison which Mr. Mead thinks he is drawing between telegraphists in May and telephonists in August and October is really between typists brought in from the open market and so-called skilled telephonists, and the latter benefited by the improved method of clearing.

The fallacy in the arguments put forward in favour of the telephonists is apparent when it is found that the average per telephone operator is 13 per hour against 18 for the telegraphist.

What is the use of claiming a lower wages bill when it is offset by wasteful and extravagant supervision and a staff whose efficiency is 50 per cent. less than that of a telegraphist. I have visited the most important provincial exchanges and it seemed to me that so far as supervision was concerned there was a cat for every mouse; while, after watching the working for some time, it struck me that if the supervisors were skilled board operators it would have paid better to dismiss the board operators and put the supervisors to do the work.

Having skilled telegraphists we do not require an army of supervisors to do the work over again. In our judgment it is better to safeguard the public traffic by having skilled operators and few supervisors rather than unskilled operators and many supervisors.

Mr. Newlands pointed out that the periods compared by Mr. Mead were not properly comparable because the racing phonograms which ordinarily form a large proportion of the total traffic had absolutely ceased with the suspension of racing, and that the normal busy hour for phonogram traffic did not synchronise with the busy hour for telephone traffic, or with that for phonogram traffic less the racing traffic.

CORRESPONDENCE.

TELEPHONE ENGINEERING ECONOMICS.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

In the paper entitled "Telephone Engineering Economics," in the August number of the JOURNAL on page 249, Mr. Smith says that the average annual increase in operating costs increasing from £280 in the first year to £1,280 in the fifteenth is

$$\frac{1,280 - 280}{15} = 66.7$$

This is wrong, the average is

$$\frac{1,280 - 280}{14} = 71.4$$

The same mistake occurs in Fig. 7B.

In the worked-out example Mr. Smith continues "and the present value is

$$280 \times 11.52$$

$$66.7 \times 93."$$

From the equation he evidently meant $280 \times 11.52 + 66.7 \times 93$. This again is wrong, apart from the fact that 66.7 should be 71.4. Why $\times 93$? This comes from the table in Fig. 7B and is used as being the P.V. of £1 increasing by £1 p.a. for fifteen years. It is not, but suppose for the moment that it is. Then 71.4×93 would be the P.V. of £71.4 increasing by £71.4 p.a., for fifteen years. But the first year's cost is £280 not £280 + 71.4 or + 66.7, and what we have to find is the P.V. of £71.4 commencing a year hence and increasing by £71.4 p.a. for fourteen years. Therefore $\times 93$ should be

$$\times \left(\frac{100}{103.5} \text{ of } 82 \right)$$

still supposing that the constants in Fig. 7B are correct.

To show that Mr. Smith's constants do not give the required figure it is sufficient to point to the first two. It is claimed that £5, at a rate of interest not stated but by inference $3\frac{1}{2}$ per cent. compound, will furnish £1 at the end of a year; and £1.8, £1 at the end of a year and £2 more at the end of two years.

Now, as column 2 of Fig. 7A shows, the P.V. of £1 incurred at the end of one year is 0.97, and of £1 incurred at the end of two years 0.93. Therefore 0.5 in table 7B should be 0.97; and 1.8, 2.83 ($0.97 + 2 \times 0.93$) and so on, as follows, calculating to the nearest hundredth as in Fig. 7A:—

<i>n</i> years.	P.V. of £1 increasing by £1 p.a. for <i>n</i> years.
1	0.97
2	2.83
3	5.54
4	9.02
5	13.23
6	18.11
7	23.61
8	29.69
9	36.29
10	43.38
11	50.91
12	58.86
13	67.17
14	75.82
15	84.77

Mr. Smith says, instead of working out the present value of the costs for each year separately by the aid of column 2 of Fig. 7A, the present value of the entire annual costs can be obtained in the way he has shown. It is not so. By working out the present value of the cost for each year separately and summing them the present value of the total expenditure is obtained exactly: by working on the average annual increase a variable degree of error is introduced which may in itself amount to something considerable and will add to itself $67\frac{1}{2}$ per cent. by the time the fifteen years period is up. For instance in the example quoted the error due to working on the average increase comes to almost £100 in the present value. Is it then worth while, since the object of reducing costs to a present value basis is to eliminate error, to introduce a fresh source of error by adopting an approximation, merely to save perhaps five minutes' work?

W. WATSON,
London Telephone Service,
Controller's Office.

Oct. 18, 1915.

BRIGHTON TELEPHONE AND TELEGRAPH SOCIETY.

ON Dec. 12 a meeting of this society was held under the presidency of the District Manager, Mr. C. F. Moorhouse. Ten competitive papers were submitted on subjects similar to those shown on the London Society's syllabus, and five prizes were awarded, viz.:

First prize for supervising officers.—Miss M. Puttick for a paper on "Training of Student Telephonists." (As only two papers were submitted in this class, only one prize was given.)

First prize for general female staff.—Miss Bevis for a paper on "Experiences with Telephone Subscribers."

Second prize for general female staff.—Miss Mantell for paper on "Subscribers' Difficulties and Remedies for these."

Third prize for general female staff.—Miss Greening for a paper on "Experiences with Telephone Subscribers."

A prize was also awarded to Mr. G. H. Calcutt for a paper on "Experiences with Telephone Subscribers," in a class for male staff only, this being the only paper submitted in this class. A considerable amount of interest was displayed and good discussions followed each paper.

1	2	3	4	5	6	7	8	9	0	Ф	Ц	Ш	Щ
A	Б	В	Г	Д	Е	Ж	З	И	К	Л	М	Н	О
Blank	Ю	Я	Ъ	Ы	2 nd	Ы	Ч	Х	У	Т	С	Р	П
Blank	З	У	Х	В	Blank	В	У	Т	С	Р	Р	О	

"HUGHES" KEYBOARD AS EMPLOYED IN RUSSIA,

from sketch by M. Vassilii Zinovyevitch Popov, of the Upravleniya Gorodskikh Telegrafov v. Petrogradé (Telegraph "Direction" in Petrograd).

[The above interesting sketch was supplied by Mr. Crawley, of T.S.F. Unfortunately the war has interrupted an interesting description of the method by which this particular keyboard and its typewheel or wheels are employed, and its publication is therefore indefinitely postponed.—ED.]

LONDON TELEPHONE SERVICE NOTES.

It is probable that before this issue of the JOURNAL is published all the subscribers to the "L.T.S. Christmas parcel fund" will have seen the final balance sheet. The result is on on which the London Telephone Service may well congratulate itself—for so generous were the contributions that it was possible after sending a Christmas parcel to each absentee at home or abroad to send in the New Year a further parcel of tobacco to each of our comrades then on foreign soil. The letters of acknowledgment already received make most interesting reading, and each exchange or branch will receive—if it has not already received—the communications coming from the officers previously employed there, and the subscribers will thus get first-hand information of the pleasure afforded by their generosity. That the London Telephone Service can give a good account of itself in military and naval circles is proven by the variety of posts now filled by its absent members. There is practically no grade in the Army and few if any in the Navy from captain downwards that does not claim at least one member of the L.T.S. There are numbers of "A.B.'s" (a combination that sounds familiar in our ears) whilst stretcher bearers, drivers, gunners, cyclists, bombardiers, sappers, privates, corporals, sergeants, sergeant instructors, quartermaster-sergeants, regimental and otherwise, to say nothing of commissioned officers, are like ivory and peacocks were in the days of King Solomon. The addresses too from which they write—how impressive but how vague—Europe, Somewhere in France, Egypt, The East, Somewhere in the Mud, In the Field; whilst the nature of the communication ranges from the field service postcard signed by an unassuming private to the typewritten note on elaborately crested paper, setting out the fact that Captain ——— begs to thank, &c., &c. Almost as varied are the adjectives used to describe the parcels and their contents; they are: generous, most generous, acceptable, kind and acceptable, welcome, splendid, useful, lovely, practical, thoughtful, admirably assorted, judicious, magnificent, exceptionally welcome and extremely sensible, ideal! One writer describes his gift as a "happy combination of articles in one wrapping," and another as "the best chosen parcel received since arrival in France." A third recipient in that country says "just the things to please and cheer a Tommy out here," whilst yet another writes—"if you were to tell me that you were advised by some lucky beggar who has been through the whole show out here you couldn't have sent what we want more." There is not an item on the long list that is not singled out by someone or other for a special mead of approbation—even the chewing gum is commented upon as particularly useful and to be saved for the recipients next turn in the trenches.

One writer from France refers to the towel as "a very happy thought," whilst a companion says "handkerchiefs were things I really needed." A corporal, well known for the directness of his utterances when at the G.P.O. South and now in France, declares

"every small article was very useful, especially towel and cards. The book will be handed round till it is too dirty to read." Another recipient states "I felt awfully flustered at the variety of fare and didn't know what was coming next. Needless to say I have already found everything of the greatest value, and I appreciate the thoughtful and practical remembrance of the senders."

Midst such a host of letters there was sure to be every variety of sentiment, and one couldn't help feeling more than ordinarily drawn to one of our wounded comrades who claims to be without a sweet tooth and so had "sent on the preserved fruit and chocolates to his wife and child." We are sure every contributor sincerely trusts the goodies were enjoyed. Delightful are some of the delicate phrases in which comparison is made between the military life and its antecedent. One man who dates his letter from a fort three and a half miles distant from the nearest village, describes how he was out all day from early morn till eve working in water on a frosty day and with nothing to satisfy his inward cravings save a slice of bread and two sardines. "Yet," says he, "I would rather do it again than tackle a notorious case which I left behind for some other poor mortal."

A Royal Engineer, after referring to the pleasures of a military existence, says there is a "certain homesickness which obtrudes itself annoyingly into the cheerful irresponsibility of Army life and which such gifts do somewhat to alleviate. Will you," he continues, "give my best wishes for the New Year to all those whom I have loved long since and lost awhile"—if this latter is not a happy phrase in which to refer to one's erstwhile chiefs, then we do not know one.

Such quotations might be given *ad libitum*, but consideration of space call a halt. Every recipient who permitted himself to write something more than a field service postcard emphasised the fact that, over and beyond everything, he appreciated the spirit which prompted the gift, and we are sure all the contributors will feel repaid when they realise in what a remarkable manner their action kindled the bond of good fellowship between members of the L.T.S. throughout the whole war zone. The cost in time and money involved in this distribution of gifts is justified again and again by the results, and if next Christmas should see our Service still denuded of many of its members, it is much to be hoped that those who remain at home will once more give of their best to repeat such a message of good will.

One of the letters received is conceived in such a spirit of wholehearted fun and cheerfulness that we think it deserves publication in full. It is from Staff Sergeant-Major Upham, formerly of the Accounts Branch and now with the British Expeditionary Force in France. It reads—

Very many thanks indeed to you and all my friends at the L.T.S. for the very fine Christmas present which you have sent me. My word—what a time I had when it came. I stopped the war at once and ran off to my little Ark to see what my pals had so carefully stitched up for me in that parcel. I think there must have been many old campaigners on that staff committee. I have known many committees to be appointed during the history of the L.T.S. but this one was surely the strongest. Everything selected will be of the utmost value out here and nothing could have been better chosen. The first thing that came to notice was the large tube of shaving cream. It had apparently had a rough crossing like I had, and a little of it had squirted out, consequently when I had got the parcel undone (which was no easy task, so skilful was the needlework) I was greeted with a most delicious aroma. So fragrant and seductive was it that for some moments I was undecided whether to eat the cream or shave with it. Having decided on the latter course, and, after the now familiar apology "Arf a mo' Kaiser," C.D.U. commenced his toilet right away. I've never enjoyed a shave more. I couldn't help putting a little on my lips and licking it in and the verdict was "tres bon." I was strongly tempted to prolong the enjoyment by shaving my moustache off, but then, as you well know, a sgt.-major without a moustache is an impossibility. How could I expect "mes enfants" to respect me without a moustache? Shaving is now once more a pleasure. The old style of shaving with cold water and carbolic soap is now almost forgotten, although it will be a very long time before I quite forget it. Having completed my toilet, which your tooth-brush and paste and towel all helped to make the most enjoyable of my life, I proceeded to other fields of enjoyment. I attacked the biscuits, chocolate, preserved fruits and peppermint with great relish and then went out once more to carry on with the war, which of course had been at a standstill all this time. I was strongly-minded to stay a while and play a game of patience with the cards you sent but "Ars longa vita brevis" (I'm not over confident of the spelling of that last phrase so I've written it rather indistinctly). You have no doubt all read in the press of the recent lull on the Western front but the

papers have not disclosed that it was due to the fact that C.D.U. had received a Christmas parcel from his friends in the L.T.S. . . .

Having finished the war for the time being, my next consideration, on arriving once more at the "Ark" was to dispose of all the good things in a place where my partners, the rats, wouldn't be able to get at them, so I wrapped them up and suspended the parcel from the centre of the Ark. At night I lie in my blankets and try to watch the rats, through the darkness, squirming in torment. Rats are all very well in their way. They are very nice as companions to talk to at night. (You can say quite a lot to a rat without hurting his feelings), but when it is a matter of Vichand chocolate and Vinolia cream—oh dear no. However, I should really be very lonely at night without them now. You are perhaps wondering what I mean by the term "Ark." Well it is a small structure of canvas stretched on a wooden frame. I call it the Ark because it is nearly always half in and half out of water, and is inhabited by other animals besides myself—animals which bite, unfortunately. It is, for want of a better place, my home. It is not elegantly or expensively furnished, although I must say that my orderly does his best with what furniture there is, for instance he makes my bed (such as it is) in such a place that the rain will drop in my eye and wake me up betimes in the morning. My washstand (which consists of an old box) and my toilet set (a petrol can) are placed with such nicety, that on jumping out of bed I have to fall over them—this is to complete the waking-up process. In happier days this box proudly held munitions of war, but now it has to bear in silent humiliation the splashes from the ablutions of a meek Civil Servant. There are two other pieces of furniture which complete my suite—one a writing table and the other a stool (both made out of munition boxes). Several postcard photos adorn the walls but there is plenty of room for more, and if any of the staff of the L.T.S. (both sexes) who may see this letter have any spare postcard photos of themselves, it would give me very great pleasure indeed to see them on the walls of the Ark—I mean the photos, not the staff. You have no idea how a postcard of someone whom you knew in the old life, takes you back again to peaceful and beautiful England. It is only when you leave home that you realise what it is. If you would learn to love England and Peace, come and fight for both in France.

Well to continue the description of the Ark—there is only one other decoration worthy of notice and that is a sprig of mistletoe. It was put in the button-hole of my coat by a little French boy and it now hangs over the door of the "Ark." Unfortunately, it is never used. Despite the plebeian tone of my abode it has been honoured by the attentions of a would-be burglar. Some few nights ago I woke up and found someone trying to get in. I waited until he had got the door open and then squirted a flash lamp in his eye and wagged a huge revolver at him. I also uttered the two magic words which never fail in this country, "*allez tout de suite*" and he vanished into the night. The enemy was routed without my having to get out of bed and falling over the petrol can.—Another victory which wasn't recorded in the papers. . . .

I must once again thank you all very much indeed for your Christmas gifts and kind wishes. I can assure you that both are very much appreciated and highly treasured by me. I sincerely trust that you are all well and that you will all enjoy a very merry Christmas and a happy New Year, and that the coming year will see us together again celebrating victory and peace.

These notes cannot be concluded without an expression of thanks from all concerned to Mr. White, the Trunk Exchange Manager, who worked untiringly to make the fund a success and to secure the utmost value in goods for the money expended. The committee charged with responsibility for the fund accorded to him a special vote of thanks and a similar vote to Miss Cox and the other ladies working with her on the difficult task of packing the parcels. It says much for the quality of their work that practically all the parcels were received in excellent condition, although several had long and devious routes to follow ere they reached the addressee.

All other news has to be left over till next month.

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

Transfers—

Miss E. M. FULLFORD (Assistant Supervisor, Class II) has been transferred from London Wall to Dalston Exchange.

Miss A. TOBEN has been transferred from Dalston to London Wall.

Miss L. E. R. COPPIN (Assistant Supervisor, Class II) has been transferred from London Wall to the Trunk Exchange.

Miss H. HILL (Assistant Supervisor, Class I) has been transferred from Gerrard to Central Exchange.

Miss E. EVES (Assistant Supervisor, Class II) has been transferred from Gerrard to the Hop Exchange.

Miss E. SMITH (Assistant Supervisor, Class II) has been transferred from Gerrard to London Wall Exchange, and was presented with a gold signet ring by the supervisors and an eider-down quilt by the operators.

Miss STEABEN, of the North Exchange, has been transferred to the Central Telegraph Office.

Miss E. N. ELVE, of the Park Exchange, has been transferred to Trunks.
Miss E. E. PHILLIPS has been transferred from City to Museum Exchange.

Resignations—

Miss R. DONNELLY (Assistant Supervisor, Class II), of Museum Exchange, has resigned in view of her approaching marriage.

Miss MINNIE M. A. DUNN, of Hampstead Exchange, has resigned in view of her approaching marriage, and was presented with a silver cake basket and other gifts by the staff.

Miss MAY E. LIMMERS, of Hampstead, has resigned to be married, and was presented by her colleagues with a silver cake basket and other gifts.

Miss M. M. BALMBRA, of Hampstead, has resigned, and was presented with a manicure set by her colleagues.

Miss EDITH REYNOLDS, of East Exchange, has resigned on account of her approaching marriage, and was presented by the staff with an oxydized silver rose bowl and several other useful gifts.

Miss MABEL FLOYD, of Ilford Exchange, has resigned to be married.

Miss TAYLOR, of North Exchange, has resigned.

Miss LAW, of North Exchange, has resigned.

Miss ROSALIND M. ANDERSON, of Dalston Exchange, has resigned to be married.

Miss E. G. MACE, a P.B.Ex. Telephonist, attached to London Wall Exchange, has resigned owing to her approaching marriage.

Miss M. G. TODD, of Hammersmith Exchange, was presented with a cameo brooch on resigning.

Miss M. BAKER, of Avenue, has resigned to be married.

Miss M. FRENCH, of Avenue, has resigned to be married.

Miss D. SPRATT, of Avenue, has resigned to be married.

Miss DOROTHY KERRIDGE, of Wimbledon Exchange, has resigned in view of her approaching marriage, and was presented by her colleagues with a clock and an *epergne*.

Miss K. YERBURY, of Mayfair Exchange, has resigned to be married, and was presented by her colleagues with a coffee service and other useful gifts.

Miss W. E. LOFTS, of the Hop Exchange, has resigned.

Miss L. FITCHETT, of the Hop Exchange, has resigned.

Miss E. M. HOLMES, of the Hop Exchange, has resigned owing to her approaching marriage, and was presented with a tea service.

Miss G. A. BRUSH, of City Exchange, has resigned owing to her marriage, and was presented with a salad bowl and several useful gifts.

Miss E. ANDERSON, of Paddington Exchange, has resigned, and was presented with a silver manicure set.

Miss G. HARMAN, of Paddington, was presented with a gold signet ring on the occasion of her resignation.

Miss D. BALDWIN, of Paddington Exchange, has resigned, and was given a gold brooch.

Miss E. E. WATERMAN, of Greenwich Exchange, has resigned on account of her approaching marriage, and was presented with a set of carvers and other useful gifts.

PROVINCIAL STAFF.

Miss B. E. EAYRS, Telephonist, Norwich, has been promoted to the position of Supervising Telephonist at Mansfield, in the Nottingham district, and upon leaving the Norwich district in December last was the recipient of a gold bracelet from the staff as a token of their good wishes.

Miss E. M. LEE, Clerical Assistant, Exeter, on resigning to be married, was presented with a dinner service. The presentation was made by the District Manager, Mr. Howard Eady.

Miss W. M. HOLLAND, Telephonist, Eastbourne, on leaving the Service to be married was presented by the staff with a case of fish knives and forks.

OBITUARY.

Mr. JOSEPH THYNE.—There passed away at Glasgow on Saturday, Dec. 18, one of the men who was admired of his fellows for his sterling qualities and who served well his day and generation. Not known beyond his own office Mr. Thyne was a real helper there. During the strenuous days of competition in Glasgow he acted for some time as Chief Clerk to the National Telephone Company and later as the District Manager's Confidential Clerk. These were the days when great difficulties were experienced in giving reasonably decent service and when verbal complaints were frequent.irate subscribers who wanted to interview someone in authority found in Mr. Thyne a stalwart who did not take the complaint "lying down" but who was possessed of that indefinable quality—tact—and many who came to "curse" went away if not "blessing" at any rate placated in mind. His fellow-employees found in Mr. Thyne one who was always ready to help with hand or advice. He had a sunny disposition which was in those days a great asset. On the transfer of the telephone business to the State Mr. Thyne was given the post of Assistant Superintendent, Class II, in the amalgamated Glasgow office. The passing of Joseph Thyne is a great loss to all his friends and great sympathy is felt for his widow and child.

Acting-Quartermaster FRADD (Cardiff City Battalion).—Capt. Williams and Lt. Otto Jones, "C" Company, 16th Cardiff City Battalion, wish it to be known to the staff that Mr. Fradd (Clerical Assistant in the District Manager's Office, Cardiff), who recently died on Salisbury Plain from pneumonia, gave his life for his country as much as if he had been killed in action. As quartermaster-sergeant it was his duty to look after the food and comfort of the men. Three or four days before he died he got very wet, but, forgetting himself, he gave all his attention to his men, and stuck to his duty almost to the last. Sergeant Fradd was an excellent N.C.O., did his duty thoroughly, and was held by all ranks in the highest esteem.

Economical Furnishing Out of Income

Telephone
CENTRAL 13711.
or send Post-card
for Prospectus to
THE SECRETARY.

EVERYTHING FOR THE HOME.

Furniture, Carpets, Pianos, Clocks,
Baby Carriages, Cycles and Motor Cars.
The combined Stocks of the best
London and Provincial Firms—Firms
which sell for Cash prices only—for
your personal selection.

Civil Service Mutual Furnishing Assn., Ltd.

(ESTABLISHED 1877)

15, Charterhouse Street, Holborn Circus, London, E.C.

OPEN AN ACCOUNT AT CRICHTONS'

Known and Recommended
Everywhere.

Let us send you a new Edition
of the Mode Book, 48 pages of
the newest and best fashions,
many original ideas, in

**Furs, Fur Coats,
Costumes,
Overcoats, Macs,
Blouses, Frocks,
Underwear, Shoes,
Trunks, etc., etc.**

All supplied
on our
well-known
'Times' System
from

5/-
MONTHLY
strictly private
and
confidential.

We are the only
actual
Manufacturing
Furriers
dealing direct
with the
profession.

Buy from
the Makers.

Special Terms
to Telephone and
Post Office Staff.

CRICHTONS' LTD.

Manufacturing Furriers and Ladies' Tailors,
14, CRICHTON HOUSE, DEVONSHIRE SQUARE, LONDON, E.C.
(One minute from Liverpool Street Station).

HASTINGS

A WINTER RESORT.



HOLIDAY HOME for LADIES

For Particulars and Terms apply to the Hon. Sec.:

Mr. THOS. HUME,

The Sunday School Union,
56, Old Bailey, London, E.C.

Take Hold of Success

More chances are opening up to-day for better-than-average men and women than ever before.

Don't be left behind.

Stop right here and think—don't mar your future by hesitation and timidity—develop your mental efficiency on practical lines—train your mind to achieve—to grip every chance and make the most of it.

Arnold Bennett says mental efficiency is essential to success.

This series of mental efficiency books, edited by a business expert who has helped thousands to success, has just been printed, and to first buyers we offer to send them on approval at our risk. They are marvellous books, unfolding the secrets of business success, rapid progress and certain fortune. Apply quickly for an approval set; only a certain number available.

MENTAL EFFICIENCY SERIES.

Poise: How to Attain It. By D. STARKE.
Force of Character: How to Develop It. By D. STARKE.

Timidity: How to Overcome It. By YORITOMO-TASHI.

Influence: How to Exert it. By YORITOMO-TASHI.

Opportunities: How to Make the Most of Them. By L. CHARLEY.

Common Sense: How to Exercise It. By YORITOMO-TASHI.

Practicality: How to Acquire It. By R. NICOLLE.

Perseverance: How to Develop It. By H. BESSER.

Speech: How to Use It Effectively in All Phases of Daily Life. By XANTHES.

Personality: How to Build It. By H. LAURENT.

Any single volume can be supplied for 3/-; 3/4 by post.

Exclusive Terms to readers of the T. T. J.

By using the Coupon below you can have the entire set to examine for Three clear days, at our risk. You can then either return them or keep the set and send

2/6 only,

the rest being payable by monthly instalments.

YOU RUN NO RISK.

Coupon for Free Inspection.

To Messrs. FUNK & WAGNALLS,
134, Salisbury Square, London, E.C.

Please send me on approval for three days, carriage paid and entirely at your own risk, a set of the MENTAL EFFICIENCY BOOKS. If approved, I will send 2 6 within 8 days and 2 6 per month thereafter till the full purchase price of 30/- is paid. If I do not want the books after inspection I will return within three days of receipt.

Name

T.T.J. Address

How will the War be Won?

The British Ambassador at Petrograd says: "The Navy will, unless I am mistaken, prove a vital factor."

Another equally high authority says: "It is the Navy that will—slowly but surely—strangle the life out of the Huns and bring them to their knees."

To understand aright the debt you owe the Navy get

THE BRITISH BATTLE FLEET

ITS INCEPTION AND GROWTH THROUGHOUT THE CENTURIES TO THE PRESENT DAY

By FRED T. JANE,

WITH

Twenty-five Illustrations in Colour from Water Colour Drawings

By W. L. WYLLIE, R.A.,

and numerous Plans, Maps, and Photographs, &c.

PUBLICATION SANCTIONED BY THE ADMIRALTY.

THE ACCOMPLISHED AUTHOR.

It is the work of a man who writes out of the fulness of knowledge that comes from a lifetime study. An author who writes in such a way as to render a subject, bristling with technicalities, as clear as noonday to all.

This book is no mere catalogue of fighting ships, but the only genuine

HISTORY OF THE NAVY.

It treats of types and designers of those types, takes account of every genuine improvement in "effectiveness" from the days of the "Great Harry," commissioned by Henry VII. (the first British ship designed and used exclusively for war), down to the largest and latest of our super-dreadnoughts, "The Queen Elizabeth."

It gives an authentic account of the important new arms

THE SUBMARINE AND THE WATERPLANE.

Mr. Jane graphically describes both the uses and the limitations of these remarkable engines of war.

In short, this is probably the most vital book of the day, for it makes plain to all the great

task with which our men and our Fleet is entrusted.

SPECIAL VALUE TO MUNITION WORKERS AND INVENTORS.

New inventions were never in such demand. The Admiralty and the Munition Department have both set up influential Boards of Distinguished Men specially to examine all ideas submitted, but these ideas must be practical. Read "The British Battle Fleet" to understand what is wanted by the Navy.

YOUR SONS IN THE NAVY WILL WANT IT.

They will revel in this book if you send it to them, or keep it until they return to civil life. They know it is written by an able man well qualified to write what is undoubtedly the best account of the Navy, its present purpose and past achievements.

"THE REFEREE" says:—

"The author has 'done his bit' to turn our rule-of-thumb nation into a scientific nation by explaining how the wheels go round. . . . In these days such a book as this is priceless."

ILLUSTRATED CONSPECTUS FREE.

Containing Coloured and Black and White Prints of Famous Ships together with full details showing how the work can be purchased by all without strain upon the pocket.

Please send Form or a postcard mentioning *The Post Office Telegraph and Telephone Journal*.

The Library Press, Ltd., 5 & 6 Portugal Street Buildings, Portugal Street, London, W.C.

Please send me the Illustrated Conspectus of "The British Battle Fleet." This request does not in any way imply that I will purchase the book.

Name

Address

THE Telegraph and Telephone Journal.

VOL. II.

MARCH, 1916.

No. 18.

CONTENTS.

	PAGE	EDITORIALS—	PAGE
THE NEW POSTMASTER-GENERAL	115	AIR RAID WARNINGS	126
THE SECTION SUPERVISOR AND HER METHOD OF WORKING	116	THE SILVER LINING	126
A TRAFFIC DEPARTMENT IN THE NEAR EAST.—III. BY FLORENCE J. MINTER	117	MIXTURE AS BEFORE	127
TELEGRAPHIC MEMORABILLIA	121	THE TELEPHONE IN THE NEAR EAST	128
TRAINING OF STUDENT TELEPHONISTS. BY MAGGIE PUTTICK	122	HIC ET UBIQUE	128
OUR MONTHLY RECORD OF NAVAL AND MILITARY HONOURS	123	POST-WAR POLICY IN RELATION TO LABOUR AND TIME-SAVING DEVICES. BY H. C. GUNTON, M.I.E.E.	129
THE TRAINING OF THE MALE NIGHT TELEPHONISTS. BY JAS. MAGNALL	124	CORRESPONDENCE	135
LONDON TELEPHONE SERVICE NOTES	125	PERSONALIA	136

Subscription : To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies : To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

THE NEW POSTMASTER-GENERAL.

THE RIGHT HON. JOSEPH PEASE, M.P., has been appointed to succeed the Right Hon. Herbert Samuel as Postmaster-General. Mr. Pease was M.P. for Northumberland (Tyneside Division) 1892-1900, for Essex (Saffron Walden) 1901-1910, and for Yorkshire (Rotherham Division) since 1910. He was a Junior Lord of the Treasury 1905-08, Parliamentary Secretary to the Treasury 1908-10, Chancellor of the Duchy of Lancaster 1910-11, and President of the Board of Education 1911-15.



[Photograph by Langfrier, Ltd.]

The Right Hon. JOSEPH PEASE, M.P.

THE SECTION SUPERVISOR AND HER METHOD OF WORKING.

THAT the London telephone service is improving in many directions is beyond doubt.

Definite progress has been made in the provision of plant, the method of teaching learners in properly equipped operating schools, the standardisation of operating practice, and in the better adjustment of operating loads to staff. In addition the traffic instructions issued, if somewhat lacking in conciseness, are yet well considered and helpful. It is unfortunate, however, that the improvement in the quality of the service has not been more marked.

Admittedly the telephonist's task is a difficult one, but her difficulties hardly justify the present operating irregularities. Many reasons may be suggested, but the one favoured here is that the supervising methods of the section supervisors are at fault. The responsibility for this, of course, rests with the management, and of the 220 traffic instructions issued to date not one deals with this most important subject of the supervisor's method of working.

The supervisor's qualifications have been studied, and a good deal has been written, especially in connexion with the promotion of operators to supervising positions. Great stress has been laid on the moral qualifications, perhaps too much, for some supervisors appear to rely more on moral influence than on physical exertions.

Certainly at many exchanges a visitor might be excused for thinking the section supervisor's position more ornamental than useful, the impression received being that her periods of immobility are only varied by measured pacing to and fro at the backs of the telephonists. The supervisor herself, if questioned, would probably state that she was exercising "general supervision."

Now the assistant supervisors, Class II, from which grade the section supervisors are drawn, are, like the N.C.O.'s of the British Army, the backbone of the service, and their efficiency ultimately determines the quality of the operating. In August 1909 the *National Telephone Journal* published an article entitled "The Supervisor; her Qualifications and Duties," in which the theory was advanced that the normal position of the section supervisor, when not engaged upon definite routine duties, should be at the switchboard in circuit with her operators. That, perhaps, was an overstatement of the case for the more active participation of the supervisor in rendering good service, but it is seriously contended that a development along the lines indicated would make for speedy improvement in the quality of the service.

Unfortunately in the past, and particularly during the restriction of exchange development due to the transfer, the operators were in many cases called upon to handle abnormal loads, and the supervisor's energies had to be concentrated upon equalising the calling rate, by passing calls from one position to another. This is not nowadays the most important duty of the supervisor, and she should, with reasonable loads and good distribution, be able to devote more time to improving the quality of the service. Under normal conditions and with enthusiastic team work the telephonists can feed themselves with better results than when they are fed.

Starting with the assumption that all supervisors possess the right personality, and have a thorough knowledge of operating practice, the question remains how they can best perform the duty of ensuring that their operators are correct in speech and manipulation, and that the subscribers, "B" operators, and other officials on whose co-operation the service depends, are doing their part correctly.

The method of performing such definite routine duties as:—

1. The arrangement of staff at positions.
2. Passing calls to equalise the rate of calling.
3. Attending to complaint and fault dockets.
4. Answering written complaints.
5. Changing telephonists' instruments when out of order.
6. Checking and collecting tickets.
7. Educating new subscribers in service matters.
8. Special coaching of learners.

9. Periodical reports on the progress of operators.

10. The interpretation of new instructions, &c., &c., are fairly well standardised. Their performance does not depend upon the supervisors' initiative, and should not occupy much of her time providing the exchange management is ahead of its trouble, and not behind it.

Coaching or aural supervision at the switchboard in circuit with the telephonists, as practised at most exchanges, is a serious duty requiring continuous and undivided attention. Usually the senior telephonist relieves the supervisor of her routine duties, or a neighbouring supervisor takes over her section, and the supervisor having assembled a chair, paper and pencil and a headgear instrument, withdraws herself from the team as a whole, and attaches herself to the operator to be listened on. This may be necessary when reporting upon learners, making quarterly reports on operators, and such special cases where the calls and irregularities have to be recorded, but the supervisor's closer contact with the service should not be limited to these occasions.

With the use of hand-sets and duplicate instrument jacks, as now provided, the section supervisor should be able to spend in circuit with her operators the greater portion of the time now occupied in general supervision. While still doing this she should be able to exercise the general supervision necessary to maintain discipline, to be at her telephonists' disposal should they wish to refer difficulties, and to observe the calling rate, so as to render assistance if required. The "B" supervisor not having to pass calls will have more time to devote to aural supervision.

At slack times when the telephonists are covering more than one position, or during rush periods, the necessity for distributing calls will be greater, and the supervisor will naturally revert to general supervision.

Except for flagrant breaches of rules, aural supervision should be treated as educational rather than as disciplinary.

By spending a considerable portion of her time in listening at the switchboard in circuit with the operators, and in educating them in correct methods, the supervisors will gain an intimate knowledge of variations in the service, and this added knowledge must in turn increase her usefulness to the service.

Finally she will be enabled to control the service, and not merely the visible actions of her telephonists.

P. J. M.

DEATH OF A PIONEER OF SUBMARINE TELEPHONY.

We regret to record the death of Mr. C. J. WOLLASTON, at Burnham, Somerset. Mr. Wollaston was born at Clapton in 1820 and was a member of the small company to which was transferred the concession granted by Louis Napoleon for laying the telegraph line under the English Channel. He was the responsible engineer in charge of the operations on the *Goliath*, which left Dover on Aug. 23, 1850, to lay the line to Cape Grisnez. The *Goliath* was escorted by the *Widgeon*, the Government surveying vessel, to show her the way on a track previously marked out by a line of buoys. Leaden weights were fastened to the cable at each 100 yards to ensure its going to the bottom. At six o'clock in the evening the *Goliath* anchored close to the buoy marking the seaward end of the line to the shore on the French side. The results of the first attempt at messages were hardly satisfactory. Although signals were exchanged, communication ceased a few hours later, and on Aug. 3 the cable was broken.

Nevertheless, the possibility of communication had been proved, and another concession was obtained from Louis Napoleon, under which telegraphic communication was to be established by October 1851. The undertaking which worked this concession subsequently became the Submarine Telegraph Company, and Mr. Wollaston, along with Mr. Crampton the well-known railway engineer, were the engineers. A cable was manufactured for the purpose at Wapping, and successfully laid by Sept. 28, 1851. Mr. Wollaston who was on the Government vessel *Blazer*, by which it was laid, had been responsible for the electrical testing of it.

Communication with the shore was maintained continuously, and, to quote the account given in *The Times* on the following day:—

"At nine o'clock, when about five miles from land, a *feu de joie* was fired from the extreme end of 25 miles of wire to the land, being a sort of electrical cannonade, which was kept up from time to time, amid the *vivas* and huzzas of the several parties engaged in this useful and, as regards its future advantages, important enterprise."

At ten o'clock in the evening the *Blazer* had anchored within three and a half miles of the French coast, and at 6 p.m., on the 28th intelligence was received at the South Foreland, by the submarine telegraph itself, of its completion to the French coast near Calais, though a miscalculation had been made in the length of the cable and a temporary connexion had to be employed for the last half-mile at the French end. The cable was opened for public use on Nov. 13.

A TRAFFIC DEPARTMENT IN THE NEAR EAST.

BY FLORENCE J. MINTER (*Superintendent of Traffic, Constantinople Telephone Company*).

PART III.

THE official opening date was to be Feb. 28, 1914, but, on Feb. 5, we commenced to give an unofficial and free service to certain subscribers, between 8 a.m. and 8 p.m. at Péra; and, on the 24th of the same month, at Kadiköy on the Asiatic side. Stamboul, where the construction had been unavoidably delayed, was not opened until Feb. 28, and even then was not in a finished condition, some parts of the apparatus not being tested out.

The advantages of the temporarily free service are obvious. It gave the operators practice with working subscribers, and if some connexions were at first a little faulty, the subscribers were not in a position to complain. As a matter of fact, instead of complaining, from the beginning they were very enthusiastic and complimentary over the speed of answer and connexion, and this, not only during the period when they were not being charged, but after they had paid their rent, and subscribers generally were joined up.

The fact that we did not receive more than a dozen written complaints of the service during the year was, by a traffic man I have met in London since my return, strangely attributed to the possibility of the subscribers being unable to write. I was able to assure him of their excellent education in their own languages, and can vouch for their fluency by word of mouth or on paper to adequately express themselves on most subjects, when called upon.

Tables were drawn up in the Traffic Office on the assumed growing capacity of the operators. Copies of these had been supplied to the Engineer-in-Chief, who selected the given number of subscribers to be joined up daily to each operator's position. The actual subscribers so connected were selected by him from the distribution sheets already referred to, and were in some cases Ministers or other Government or Municipal officials, who were quite childishly eager to be among the first to have the use of the telephone. Generally, they were those whose lines were most convenient, from the engineering point of view, to connect early.

There are fifteen "A" positions at Péra, so that as five subscribers only per position were allotted on the first day, there were but 75 subscribers working; not enough to give a sufficiently practical calling rate, and the number was increased on each succeeding day much beyond this proportion.

The capacity of the operators grew beyond expectation and they were quickly able to take more lines than the engineers were temporarily in a position to join up. On the official opening day the number of exchange lines working was 682; i.e.,

Péra	...	...	441
Kadiköy	...	...	88
Stamboul	...	...	153 (first day of working).

In all cases some unexpected cable trouble prevented us showing better figures.

There was great excitement among the operators during the first few days; their eagerness to take calls causing some amusing competitions to be the first to "plug in." After previously hearing through the instrument, only the voices of their supervisors or each other, to actually have subscribers on the line was almost too much for some of them, but this natural feeling quickly died down, and, being anxious to show me how well they had learnt their lessons, and how desirous they were of coming up to the "English standard," they rapidly fell into quiet methods of working and adopted a business-like tone.

Unfortunately, having to leave Turkey hurriedly and with only such personal luggage as we thought it possible to get through under prevailing conditions of travel, I could not bring copies of the various records taken from time to time, but I do know that, in spite of all the difficulties of tuition and equipment, we were eventually able to give a really excellent, clean and quick service.

Indeed it was quite startling when, on asking for a number, to have the immediate reply and subsequent repetition, which,

except for the difference in language, sounded remarkably like the telephone operators at home.

I would here draw attention to the rising inflection which we there insist upon from the operator in his repetition of numbers and which serves its purpose in provoking a reply from the subscriber. No connexion must be proceeded with until confirmation of the number in thus obtained, and the small loss of time in waiting for the reply, is amply justified by the prevention of much wrong number trouble.

A few days after the opening when the appearance and state of the switchrooms became normal—remembering the anxious moments and sleepless nights I had passed in dread of chaos—I felt inclined to rub my eyes to see whether it were not a dream; or whether I had not been taken, in some mysterious way, back to one of the smaller Metropolitan exchanges such as New Cross or Dalston.

It is no wonder that I am proud of my staff, for apart from the difficulties of tuition, they could not commence their actual work under normal conditions. Certain equipment was still unfinished—some incorrect—some actually missing. I shall never look at brass paper fasteners without thinking of their possibilities as "multiple pegs"; nor see a paper cigarette mouthpiece without memories of their serving as "out-of-order plug caps." 200,000 of the former were in use, not only on the multiple for the subscribers not yet joined up, but enamelled in black, white, or the required colours, as ordinary multiple pegs. These were, of course, but minor troubles and small indeed compared with other problems we had to solve, with "suppliers" some three thousand miles away.

The monthly growth up to the last figures I have at my disposal, for the end of February 1915 (fourteen days before our system was confiscated) may be interesting:—

				Direct lines.
At the end of	March	1914	...	1,653
"	April	"	...	2,591
"	May	"	...	3,084
"	June	"	...	3,475
"	July	"	...	3,673
"	August	"	...	3,803*
"	September	"	...	3,883
"	October	"	...	3,963
"	November	"	...	4,080†
"	December	"	...	4,194
"	January	1915	...	4,239
"	February	"	...	4,297

The months from August 1914 to February 1915 are, of course, affected by the war. During this period the Company stopped all canvassing, but had orders coming in daily. Many of these, towards the end of the time, could not be connected, as we had come to the end of our instruments; a large consignment on order and due just before war was declared, not reaching us. There were 382 signed orders for exchange lines awaiting connexion at the end of February 1915. We were actually contemplating recovering some service instruments, and those of subscribers who had closed their offices, or left the country during the war—so that we might join up the more urgent lines—the orders for which mostly emanated from the War Office, or other Government Departments. Towards the latter days, such Government agreements were accompanied by peremptory instructions to join up the lines at once, and, no matter what the difficulty in the way, all kinds of penalties were threatened should such instructions fail to be carried out. In one of these cases an instrument fitter and his assistant (the latter a Turkish boy of fourteen), on finishing their part of the installation were asked if the line were now working. On explaining that the outside staff had yet to complete their portion, they were told they must themselves proceed with the work, and their further explanation as to why this was impossible was ignored. They were placed under arrest for some hours until, happily for them, their colleague on the outside staff managed to complete the line.

* War declared with Germany Aug. 4.

† War declared with Turkey Nov. 5.



SWITCHROOM: STAMBOUL.

On another occasion, when a private branch switchboard was being fitted at the Prefecture, an unaccountable and illusive fault presented itself. The men after working until late at night were informed they could not leave the place until the matter was put right—a *gendarme* being placed in charge of them. An order had gone forth that the Chief Electrician, who came to deal personally with the matter, must not leave the place alive unless the fault was cleared. Fortunately the order in some way miscarried, and Mr. Duncan, unaware of the terrible danger he was unconsciously risking, walked calmly out of the building.

Mr. Douglas-Watson, the General Manager, also but narrowly escaped imprisonment during this time. A certain line to a Government dépôt which, owing to the urgency, was commenced before the actual signed order was received, was joined up and working very quickly. Some two days after this a letter from the Minister was received asking why the line was not completed and complaining of the delay which had ensued. The *Commissaire Imperiale*, through whom such letters were always sent, brought with it the verbal information that the General Manager would be placed under arrest under the circumstances. Enquiry brought to light a typical case of Government delays which, however, are not peculiar to Turkey. This same letter had been dictated on the day the line was completed but, as it had to be written by one certain official, and signed by another, and passed through several

hands in the process, it only reached its destination two days afterwards.

These Government and Municipal lines formed one of the minor problems to the Company. From a financial standpoint they are in many cases a dead loss owing to the terms of the concession. From the engineering point of view, as I have already related, such lines are always "urgent" and connexions must be rapidly made. From the traffic side they have to be specially dealt with. In their fanatical desire for "Turkey for the Turks" and for the exclusion of everything not Turkish, they insist on that language being used on all occasions. Two languages only are allowed by the Company to its subscribers—Turkish and French—but owing to the larger number of non-Moslem subscribers, the operator originally announced herself by "*Numero, s'il vous plait?*"—passing on into Turkish if the number, then given in, was in that language. Owing to unreasonable but very pronounced complaints from the Ministry that all operators could not, or did not speak Turkish, we reversed this introduction; the operator saying "*Lutfen numeroi*" followed by French or Turkish, as the subscriber subsequently proved to be from his reply.

As complaints still came (from Stamboul especially), that our operators could not speak Turkish correctly, we adopted a drastic but most effective measure, placing on the position next to the

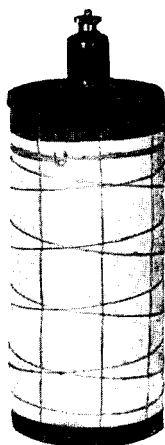
POST OFFICE STANDARD LECLANCHÉ BATTERIES

SACK FORM.



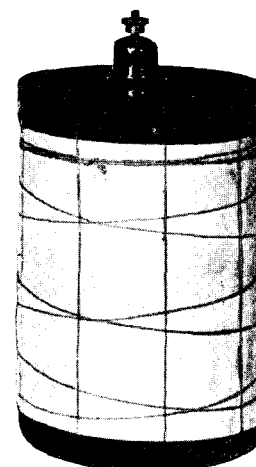
No. 2a.

2½ ins. diam. × 7 ins. high.
Weight 1 lb. 10 ozs.



No. 1.

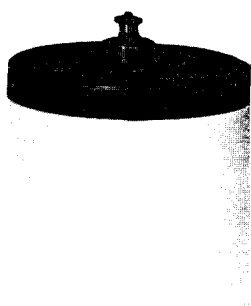
3½ ins. diam. × 8½ ins. high.
Weight 4 lbs.



No. 0.

4½ ins. diam. × 8½ ins. high.
Weight 9½ lbs.

POROUS POT FORM.



No. 0.

4½ ins. diam. × 8½ ins. high.
Weight 8½ lbs.



No. 1.

3½ ins. diam. × 8½ ins. high.
Weight 3½ lbs.



No. 2a, Circular.

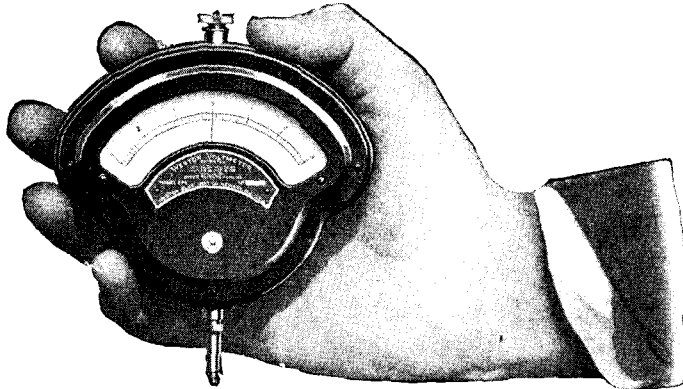
2½ ins. diam. × 6½ ins. high.
Weight 1 lb. 2 ozs.

SIEMENS BROTHERS & CO., LIMITED,

WORKS: WOOLWICH.

WESTON

Miniature Precision D.C. Instruments



MODEL 279 BATTERY TESTING VOLTMETER.

The instrument is fitted with a Detachable Spike Terminal and Flexible Lead with Spike Terminal.

DELIVERY FROM STOCK.

Weight, 11.6 oz. List Price, 49/-

WRITE FOR LIST D3.

WESTON ELECTRICAL INSTRUMENT CO.

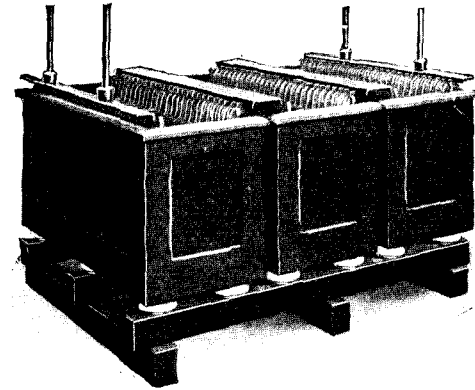
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

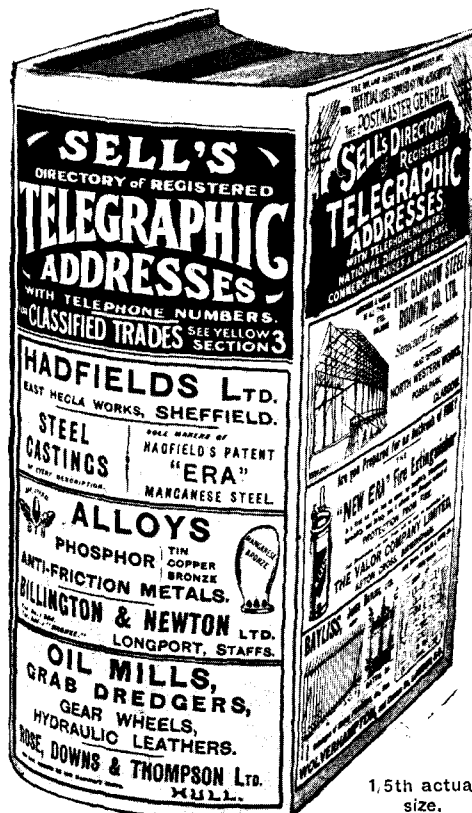
SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

Telephone Numbers

are given in the List of Firms for LONDON AND COUNTRY.



1.5th actual size.

THE GREAT NATIONAL DIRECTORY.

The Inland Abbreviated Addresses are from Official Lists supplied by Authority of the Postmaster-General

SELL'S DIRECTORY OF REGISTERED TELEGRAPHIC ADDRESSES

WITH TELEPHONE NUMBERS.

NATIONAL DIRECTORY OF LARGE COMMERCIAL HOUSES AND BUYERS' GUIDE.

Founded by HENRY SELL.

CONTENTS:

80,000 Names of British Firms with their Telegraphic Addresses and Telephone Numbers. Complete Index to the Telegraphic Addresses Registered in London and Country. 100,000 Names in Trade Section Classified under 3,000 Trade Headings, and 30,000 Names in the British Empire Overseas and Foreign Countries. With Full Postal Address, Code, Cable Address, and Trade Description.

Price of Volume 25/-

Including Annual Supplement in July giving particulars of all changes to date of issue.

IMPORTANT IMPROVEMENTS.

The National Directory of Large Commercial Houses and Buyers' Guide which was added to the Volume some years ago, now forms a large and valuable section of 600 pages closely printed, giving 100,000 names and addresses arranged by Trades. Every name in the Volume has been numbered to facilitate and cheapen the cabling of names and addresses the world over. Consular Representatives and Trade Commissioners and Correspondents in British Dominions Overseas are given, and a list of Telegraph Tariffs from London to all parts of the world, Telegraph Regulations, and Trade Marks and Brands Sections. New "Indicator" words for London Telegraphic Addresses.

Offices: 166, FLEET STREET, LONDON, E.C.

Telegrams: "SELL, FLEET, LONDON."

Cables: "SELL, LONDON."

Telephone: HOLBORN 1693

N.B. - Only those firms who have Registered a Telegraphic Address at the Post Office are inserted in the Official Lists.

ORDER FORM FOR BOOK.

To Mr. SELL, Business Dictionaries, Ltd., 166, FLEET STREET, LONDON, E.C.

Send me your Annual Volume of "Registered Telegraphic Addresses" for 1916, carriage paid, for which we agree to pay 25/- net, cash on delivery (charge includes Free Copy of Supplementary Edition published in July).

Name.....

Address.....

Date.....

Extra Strong Full Leather Bindings, 30/- net.

اسامی	نوع مشغولیت و آدرس	تلفون نومروسی
احسان بك	املاك معاملاتی آخنهسی — ۱۶-۱۵ بوميقو خان موغانه غلظه	۲۱۸۰ بك اوغلی
احسان نامق بك	بهره بانقیمی وكیلی — اغویان خان غلظه	۲۰۲۰ بك اوغلی
احسان وحسی برادرلر	تلفون الكتريك معازدهسی — ۱۷۲ ورنه حیلر	۱۸۳۵ استانبول
احسان وحسی كاظم	دعوی وكیلی — ۵ اتومونارچی خان	۱۵۵۱ بك اوغلی
احمد ابراهيم	عائله لوقطهسی — ۶۹ تشویقه جادهسی نشان طاش	۱۶۵۸ بك اوغلی
احمد احسان وشركاسی	تروت فون غزنهسی — نور غزنیه	۱۴۴۴ استانبول
احمد ادیب بك	خانه — ۲۹۹ بيوكدره حادهسی ششلی	۱۴۷۱ بك اوغلی
احمد پاشا	ویس آدمیرال انخیر — ۱۱ الكسادی خان غلظه	۱۶۱۶ بك اوغلی
احمد پاشا جوزوك صولی (میرلوا)	خانه — سنان پاشا اسکادر صلاحی	۱۹۸ قاضی کوی
احمد پاشا زاده رشیدی بك	خانه — کورنیه	۲۳ ارن کوی
احمد حلال الدین	خانه — راسم پاشا سوغای جوبرك	۲۸۶ قاضی کوی
احمد جمال	قصاب — ۴ اتلامه طاش اسکادر	۳۳۱ قاضی کوی
احمد حمدی بك	دیش طبیبی — احمدیه سوغای اسکادر	۷۴ قاضی کوی
احمد حمدی بك (قلبی)	قابل جراح — شهزاده نامی	۵۷ استانبول
احمد ذوالکفل پاشا (داماد)	خانه — اسکی صالی بازار	۷۵۰ بك اوغلی
احمد ذوالکفل پاشا (داماد)	خانه — سعاده ارن کوی	۲۱ ارن کوی
احمد دهی حرار راده	عائلی فصاحانهسی — طوبخانه اسکادر	۴۲۰ قاضی کوی
احمد شكري بك (دوفور)	امراض جلدیه و عصبیه — اسانسون حادهسی بایزید	۳۴۳ استانبول
احمد شوفی	دیش طبیبی — ۳ دیوان یول سلطان محمود سربسی	۵۰۴ استانبول
احمد عارف	قالله معازدهسی — ۸۰ نالی بازار	۱۷۶۷ استانبول
احمد عدنان عربانی راده	خانه — ۷۵ نقاش سوغای فوزعنجق	۲۴۹ قاضی کوی
احمد فاروق	غناهیه نجارخانهسی — ۱۴۳ قالیباچیلر چارشوی کبر	۱۴۸ استانبول
احمد فائق	نقال — مسار برونی جادهسی	۲۸ بيوكدره
احمد کامل بك	مطبعه — ۴ طاشحیلر قبوی بایزید	۷۱ استانبول
احمد مختار بك	دعوی وكیلی — ۸ ایزكاید اسانسون حادهسی	۱۸۰۷ استانبول
احمد مختار پاشا	خانه — کوز به بعداد حادهسی	۱۰۸ ارن کوی
احمد مختار حمدی پاشا راده	خانه — ۱۴ حور سوغای	۳۳۹ قاضی کوی
احمد مصطفی ومخدومی	تحافیه تاجری — ۳۲ قاطرچی اوغلی خان	۱۳۲۷ استانبول
احمد ناهید	محمد رائف — دعوی وكیلتری — ۳۸، ۳۹، ۴۰ ترکیا حان	۱۷۹۵ استانبول
احمد نزهت	احزانخانه — ۱۰۸ دیوان یول	۱۷۰۲ استانبول
احمد نعمان	خانه — فورغنهلی دره ۱۸ برنجی سوغای	۳۵۸ قاضی کوی
احمد نورالدین (دوقنور)	جراح — ۶۲ باب عالی حادهسی	۱۰۲۶ استانبول
احمد وغیرر	فومیسویچی املاك و اراضات — ۱۵۸ دیوان یول	۸۷۰ استانبول
اخوت اسلامیه (حاجی حمدی عاكف)	مفتی حمام سوغای فایح	۱۸۸۶ استانبول

Noms.	Occupations et Adresses.	Nos. Téléphones.
Kadrié Hanem «Vefali» Sage Femme.	131 Divan Yolu	Stamboul 1119
Kafaroff Ismail. Domicile.	Sur les Quais. Bebek. Bosphore	Bebek 13
Kafaroff Talib. Nég. en Tapis.	7-11 Kassim Pacha han	Stamboul 235
Kafaroff Talib. Domicile.	Rue de l'Eglise. Bebek. Bosphore	Bebek 43
Kahn Frères. Repres. Four. Gouvern.	12-15 Bendjbara han.	Stamboul 1191
Kaïas Jean P. Avocat.	32 Maksoudié han. Balouk Bazar	Stamboul 582
Kaiserlian S. Domicile.	Sur les Quais. Messar Bournou	Buyukdere 24
Kaiserlian S. Domicile.	5 App. Rafi Pacha. Rue Buyukdere. Chichli	Pera 984
* Kaiserlian Simon. Union han.	R. Voivoda. Galata	Pera 2300
Kalaïdjian Bédros. Dr. Médecin.	15 Yéni Mahal. Béchiktache	Pera 1441
Kalaïdjoglou M. Nicolaki. Nég. en Oeufs.	Keupru Bach. Scutari	Kadikéuy 186
Kalaïtroglou I. & Yaghdjoglou E. Nég.	69 Kétenjdjler. Aladja Hamam	Stamboul 822
Kalangs Afzendios K. Epicerie.	143 Kalliondji Coulbouk	Pera 1253
Kalinoglou A. & Prod. Frères. Avocats.	56 Talaké han	Pera 2298
Kalinoglou N. G. & Anayoglou G. A. (Eufs. Pom. Terre)	180 Tachdjilar	Stamboul 1330
Kaller Dr. (Delégue Autriche-Hongrie Santé).	Dom. App. Butter. 2 ^{me} Etage	Pera 2077
Kalpskdjoglou Nicolaki. Pharm.	Sultanne. 48 Gd Rue de Pancaldi	Pera 1181
Kaltakdjian Boghos. Droguerie.	8 Sultan Hamam	Stamboul 1831
Kaltchinian B. Const. Domicile.	8 Rue Fistikli Boyadjikéuy. Bosphore	Bebek 14
Kaltchinian B. Const. Dom. App. Kékérian R.	Hadji Mahak. Nichantache	Pera 2322
Kambalouris Yanco Eff. Avocat et Entrepr.	2-3 Ehadji han. Ferménédjiler	Pera 1988
Kamer Bey. Domicile.	Rue Nédjim	Kadikéuy 426
Kamitsopoulos Nicolas. March. Tailleur.	4 Place de Tunnel Gd rue de Pera	Pera 1025
Kammerich Werke. Poutrelle Fer.	1 Inayet han.	Pera 2310
Kanagunis P. J. & Cie. Bijout. Horlog.	Gros. 8 Kutchuk Millet han. Galata	Pera 101
Kanagunis P. Brass. «Rossignola».	332 Rue Buyukdere. Chichli	Pera 1344
Kanzah R. et E. Sarafidis. Vente Tombacs Persans.	8 Nemli Zade han	Stamboul 993
Kapamadjian A. Frs. Bijout.	11-12 Tchobadjji han. Mahmoud Pacha.	Stamboul 1621
Kapitsos. Constantinios. Habillements	3 Yagdj han. Nour Osmanie	Stamboul 1851
Kapps Edouard. Domicile.	Près Station Maltépe	Cartal 2
Kapps & Kleiner. Repres.	21 Messadet han. Sultan Hamam	Stamboul 645
Kaprielian K. Chir. Dent. Gd Rue de Pera	(Au dessus de 100,000 Chemises)	Pera 1886
Karcache N. Banquier.	6 Caracache han. Emin Eunu	Stamboul 906
Karacouch T. & Cie. Joail.	8-9 Tchobadjji han. Gd Bazar	Stamboul 528
Karaethymoglou Frères. Nég. en Fromag.	243 Tachdjilar	Stamboul 643
Karafilis Stavros. March. de Pommes.	R. Maria. St Benoit. Galata	Pera 1667
Karagheusian A. & M. Nég.	5 Astardjian han.	Stamboul 2002
Karagheusian Archag. Domicile.	159 Buyukdere djad. Pancaldi	Pera 1504
Karagheusian H. Sarkis. Banquier.	Mertzanoff han. Meidandjik	Stamboul 193
Karagheusian Krikor. Commiss.	39 Hazzopoulo han	Stamboul 963
Karagheusian T. & E. Banquiers.	14-15 Sadikie han. Bagtché Capon	Stamboul 236
Karagopian M. Pharmacie.	Couch Dili	Kadikéuy 43

* Bureau Prive. Service Idéal (Voir Page 11)

PAGES 31 AND 105 OF THE CONSTANTINOPLE TELEPHONE DIRECTORY IN TURKISH AND FRENCH RESPECTIVELY.

testing position at this exchange, all the Government, Municipal, and special lines such as the Turkish press and known agitators, and gave a Moslem operator a regular duty on this position between 9 a.m. and 5 p.m.—her relief being a Jewess who spoke Turkish perfectly. The testing operator gave such small assistance as she was able, in clearing, from time to time.

A Turkish monitor was also placed at the enquiry desk, ready to take all enquiries or complaints from Moslem subscribers; her relief also being a particularly good Turkish speaker.

Another of the many directions in which the Chief Electrician and I were forced to conspire to depart from "standard practice," was, that as the Pera switchboard became full up, and it became impossible to obtain supplies, we ignored end positions and the usual reduction of 25 per cent. and filled up every available jack, seeking only to select, as far as possible, less busy subscribers. The operators thus took the full 180 subscribers per position, but it must be remembered the "calling rate" was low, not rising above 3.4 per line per day on the weekly meter reading. As there are three "Sabbaths" in the week (Friday the Moslem—Saturday the Jewish, and the Christian Sunday) there are only four normal days and the "load-line" showed a better figure for the "average day" traffic.

Writing of load-lines, reminds me that at one of my early "Traffic Officers' Meetings," when I was introducing the matter and methods of this important subject, one of my exchange managers suggested that this should be taken on a Friday as the staff would

not be so busy! He soon learnt the real object of these records, and to regret when the day selected unaccountably happened to be slack.

One of the things it was also difficult to get operators to appreciate at the beginning, was the necessity of recording ineffective calls. At one exchange an inexplicable level in traffic according to readings, compared with the growth in the number of lines, and obviously busier operating in the switchroom, was proved, on investigation, to be due to operators not pressing the ineffective key, "because they were busy!"

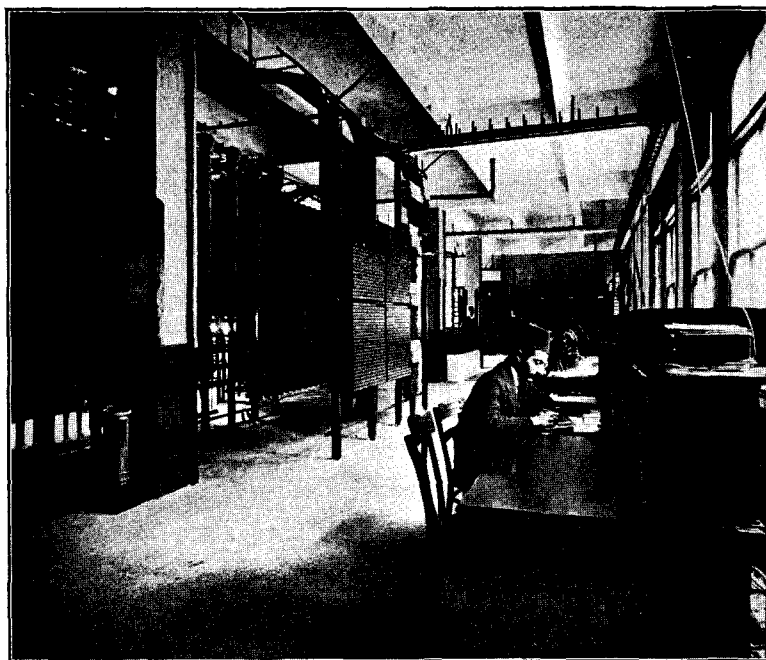
Time and patience does much always, and I should not like the amusing, if somewhat serious, questions regarding staff that I have mentioned from time to time, to lead one to think they always remained inefficient and lacking in business qualities. On the contrary, they exceeded all expectations in capacity and initiative, and, but for lack of experience which can only come with years, I would not—taking them as a whole—desire a better or more willing or loyal operating staff. Some of the supervisors were really astonishingly good, and it was almost impossible to realise that in the case of two or three they had had but a few months' training instead of years of operating prior, to their promotion to the more responsible post.

As I have before mentioned, the equipment for the small exchanges had not arrived, but, in order that the Bédék subscribers should be working, we first brought them on to a position of the Pera board, transferring them on a certain evening in February 1915,

to the Stamboul board as the Péra accommodation had then become insufficient. This was, of course, during war time, when we knew it was impossible for the Bébék and other boards, to reach us. In both cases junction lines—owing to the same circumstances, not in use as such—were taken for the 47 Bébék subscribers joined up. The average distance from Bébék to Stamboul, for each line would be not less than eight miles, in one or two cases considerably more. The speaking proved, however, to be really good.

Later we dared still more, joining up junction lines to call offices in the Company's exchange buildings at Erenkeuy and Candilli—on the Asiatic side—to Kadikeuy, and San Stefano, and Makrikeuy, down the Marmora, to Stamboul. The special number plates for the answering jacks, made of cardboard in the Traffic Office, had the code of the exchange in addition to the number, and the lines were connected to a spare multiple section; in each case with a peg in the jack immediately before that connected, showing the code and number of the call office.

In the case of the Bébék subscribers a spare multiple section was given over, with a special stile strip made accordingly, and the whole of these subscribers were brought in to one particular answering section.



APPARATUS ROOM, PÉRA EXCHANGE.

We also connected two important subscribers at Erenkeuy—sons-in-law of the Sultan—who should have worked on that exchange—to Kadikeuy. In ordinary times, connexions from Erenkeuy to Stamboul would, owing to the long distance, have been made on special transmission junctions, but as the loading of these junctions was left in an unfinished state through the British Insulated Company's staff having to leave through the war, only the ordinary lines could be used. It must be remembered that the junctions on both continents, go for miles up the Bosphorus before they can cross by the submarine cables at the narrowest part.

These call offices, as in all cases in Constantinople, were "Attendant" offices, it being impossible to employ automatic boxes—on account of the coinage, which varies much in size and composition for similar coins; there being silver, nickel, and copper piastres, and half piastres (2*d.* and 1*d.*).

One matter concerning the Directory may not be unworthy of mention. This had, in common with all the Company's publications, to be printed in Turkish as well as French. In the former one reads backwards, and in both the extracts illustrated, it will be noticed that we adopted the American principle, of showing the subscriber's name and address first and the exchange and telephone number afterwards. The contrary plan—in use in Great Britain—always

struck me as illogical and clumsy. When one person requires the telephone number of another, he naturally first looks for the name of the subscriber—the number follows in natural sequence.

In practice our method was found excellent and from a traffic point of view in the exchanges themselves, admirable. The Turkish subscribers are indexed under their first name—their second or surname altering as a rule with each generation. This Ali Abdullah may be the son of Abdullah Hussein, whose father was probably Hussein Murad, or even Hussein Hussein. To identify the particular Ali, Abdullah, or Hussein, is a little confusing and difficult at the enquiry desk.

I intend, when we return and the small exchanges are opened, to have enquiry positions at three exchanges only; Stamboul will take San Stefano, Makrikeuy, and the Princes' Islands; Péra the European-Bosphorus exchanges; and Kadikeuy those on the Asiatic side.

Such statistics and records as are required from the small exchanges will be sent to the Traffic Department through the two exchange managers placed at Péra and Stamboul, who will divide the responsibility for the different exchanges. So far as possible the exchanges are now and will be relieved of all possible clerical work, the results of their records being dealt with by a statistical officer in the Traffic Office.

The travelling supervisor, to whom it is intended to give more responsibility than at home, will deal with all operating complaints, statistical and other recording, errors, for the small exchanges, as reported to her from time to time by the exchange managers.

Each small exchange will have a resident "gardien" or "care-taker operator." In five cases these had already been appointed, and as travelling facilities (or the want of them), have always to be reckoned with, I departed from the usual home practice of engaging only employees of the Company or Department, and advertised for suitable outsiders, who resided, or were willing to reside in the different localities, and who had daughters of an operating age. The necessity of a knowledge of the languages of the country precluded any of the British workmen and their families, occupying the premises as operators.

The travelling supervisor will have a somewhat unenviable position owing to the travelling conditions of the country, and the time lost in waiting for boats or trains; on the other hand there will be no dreary monotony in her work, as there is certainly no monotony in a Traffic Superintendent's life out there.

It is much less wearisome—if often rather exciting—to visit one's exchanges by motor-boat up the Bosphorus. To take an hour's trip for the same purpose down the Marmora to the Princes Islands exchanges, or a motor run into the country to San Stefano, Kadikeuy, or Therapia is much less fatiguing than "tubes" or "buses"—and, even if one is stranded for a train at Cartal or some such remote exchange, and finds one's self in an absolutely Turkish village with only Turkish cafés in which to appease one's hunger, there is at least a novelty not to be found in more conventional surroundings at home. No one thinks of growling at the bad railway service there—one simply accepts the loss of time as one accepts so much in Turkey, as inevitable, and therefore not to be worried over.

There is still much that might be written but I fear I have already exceeded my allowance. To me Constantinople, and especially my own department in the Telephone Service, is full of interesting reminiscences—of much hard work and little playtime—some disappointments—but, I think I can claim, also some measure of success.

It may not be generally known that the general organisation of the Company is on the American principle.

The Accounting, Commercial (or Contract), Engineering and Traffic Departments, each has its own clerical and statistical staff, dealing with its own costs and expenditure. Any success achieved under the difficult conditions which prevailed, was due, I am sure, to the splendid relations existing between the departments. Each chief might be keen and anxious for the success of that portion of the work for which he or she was responsible, but neither of us thought "departmentally" and believing in the prosperous future of the Company (which in spite of being considered fatuous optimists

we still do), we were working together for that Company's welfare and reputation. One could not wish for better colleagues.

In this respect much must be said for our General Manager, Mr. Douglas-Watson, whose quick grasp of difficulties, eager and practical readiness to assist us out of them, coupled with a never-failing sympathy, lightened many of the very real burdens.

In the dark days of the last six months during the war, the "saving grace of humour" happily shared by ourselves, but which he possesses in no small degree—helped in the mutual laugh to cover the heartache of separation from our friends, and the thought of the uncertainty of our position. There is not one of the little band who remained with Mr. Douglas-Watson through the war, who has not expressed willingness to return with him as soon as it is possible, and to complete the work to which we have set our hands, and which, as Britishers, we intend to carry through. "Inshallah!" (If God wills!)

TELEGRAPHIC MEMORABILIA.

THERE have doubtless been more learned discussions on electricity before the august assembly of the Institution of Electrical Engineers than that to which its members listened on Thursday, Jan. 20 last. There have probably been more momentous discourses, more brilliantly attended meetings, but from a telegraphic point of view the paper of Mr. H. H. Harrison on "The Principles of Modern Printing Telegraphy" will probably take first place for some considerable time to come.

It enunciated no new theory, disclosed no new trick of mechanical device, laid bare to a startled world no neoteric invention, broke down no dearly loved prejudice, stirred not a single note of enthusiasm throughout the solid hour of its somewhat rapid delivery, and yet the lecturer and his subject held his audience keen and interested from commencement to close.

True the institution had spared no pains or expense to make the paper a standard work on printing telegraphs by means of a 55-page double-column pamphlet, illustrated by more than one hundred plans and sketches, some occupying a full page. The cost of this pamphlet probably reached three figures, and may be accepted as a criterion of the importance placed upon the subject itself and an appraisal of the value of its treatment by the author-inventor.

So rapid has been the development of printing telegraphs during these last two decades that the time was fully ripe for some co-ordination of the various systems, for some patient master-hand to come along and, with knowledge born of actual telegraph experience, to collate the essentials of the various systems and to place them before the telegraphic world—a unity.

As one of the "other" inventors who was present remarked, *sotto voce*, "Anyone can build up a printing telegraph system now after studying Harrison's paper, for he has hidden nothing."

Graciously referring to Donald Murray's paper read before the same institution in February 1905 on "Setting Type by Telegraph," as "the classic" on the subject of modern printing telegraphy, he quickly traced the evolution of printing telegraphy from the first successful system of Professor Hughes in 1854, over a span of twenty years to that of Baudot in 1874, and onward to the present day, detailing, explaining, discussing the principles which governed the various systems and the various electrical and mechanical means by which the inventors obtained their results. Thus, "current permutations," "step-by-step systems," "time comparison of telegraphic codes," "signal storage," "mechanical perforators," "stop and start devices," "mechanical permutation by perforated paper control," "flying print," "rolling print," "page printing," "overlap of setting and printing cycles," "speed control," "vibrating reed," "Baudot isochronous governor," "point de repere," "speed correction," "multiplex and echelon working," "flexibility of modern multiple printing telegraphs," all came under review.

It will be seen that the paper, in addition to its historic value, fairly bristled with points of interest on the all-engaging subject of printing telegraphs.

Concluding, the lecturer expressed the emphatic opinion (with which Sir William Slingo subsequently expressed his complete accord)

that "hand Morse will never entirely disappear." Out of the evening's discussion two or three matters seemed very clearly to emerge:—

- (1) The triumph of the five-unit code for printing telegraphs.
- (2) The precision of the periodic clock-hand method of Baudot synchronism, and
- (3) The growing tendency to favour multiplex systems as against automatic for printing telegraphs.

It was an inventor's night. Murray was there, alert and alive. Creed was there, thoughtful, keen but silent; and surely the spirit of Baudot must have brooded over Major Booth as he rose and championed the system of the celebrated French ex-telegraphist. Altogether an interesting and highly educative evening.

Electricity, commenting on the above paper, remarked that it was a welcome relief from the constantly theoretical discourses delivered before the members of this institution, and expressed the hope that other equally practical lectures would sensibly increase.

Some of the feats of telegraphy which have been performed during the present war period have been startling enough, and the half will probably never be told. Perhaps the following may be worthy of record, my informant vouching for the truth of the general facts. A score or so of knots of submarine cable were ordered in this country, manufactured, delivered and laid within one month of the signing of the contract. Incredible as this may appear to some, especially when it is understood that the contractors were also working at extreme pressure on other contracts equally important, I am nevertheless assured that this feat has been accomplished. When pressed for particulars of where this bundle of wires had been laid, my tantalising friend could only reply with a puzzling smile and in an enemy tongue, "on the coasts of *Weissnichtwo*."

Thoughtful correspondents from time to time thrust items of interest into my letter box, and of the more recent is an interesting book on the "Electric Telegraph," published all but half a century ago by Lardner and Bright.

From the non-technical matter I excerpt this description of a telegraphist and his work in the then telegraph office of the day:—

"The telegraphist is placed at a table upon which the instrument stands, having before him the paper upon which the message is to be written, and *at his left a provision of blacklead pencils ready cut and pointed*, usually half a dozen. . . . As the points of the pencils are successively worn he lays them on the table at his right hand. A person engaged exclusively in that process, visits his table from time to time, re-points the pencils lying on his right and replaces them on his left. This person passes round the telegraph office, from table to table, keeping up a constant supply of properly pointed pencils at the hand of each telegraphist."

Reading quite recently a small biography of men celebrated in the study and history of electrical laws, it was rather startling to learn that Volta "was four years old before he spoke his first word and then it was 'No.'" We have no record as to whom he addressed this most interesting remark, but if singularity be the sign of genius truly baby Volta bore the hall mark. A baby four years old ere it opposed a negative to a parental positive is surely unique and well deserves record!

One opens one's copy of the *P.O. T. and T. Journal* each month with just a little curiosity as to whether the scarcity of printing paper has yet troubled the managerial and editorial mind, and one wonders how the present difficulty will be met. Less pages? Higher prices? Decrease in quality of paper? Then the ancient one emerges and suggests though old, yet new, the principle of super-position. In one word the *palimpsest*. What curious results might follow! Fancy the super-position of a telegraph screed upon an erudite article on telephone statistics!

The art of abbreviation is generally well understood by the average telegraphist, but his skill has recently been severely tried by the military authorities. True he has become quite conversant with alphabetical enigmas of the type of O. C. P. P.C.L. I. C. E. F. as an address, but he is sometimes puzzled by smaller combinations, even as the weak things of the world confound the mighty; therefore for his or her future guidance, C. I. G. S. must not be interpreted as Chief Imperial General *Strafer* but Chief of the Imperial General Staff. Please note!

J. J. T.

TRAINING OF STUDENT TELEPHONISTS.

BY MAGGIE PUTTICK (*Brighton*).

THE question of the training of telephonists is one that has not gained the attention to which it is entitled on account of its importance and effects on the telephone system.

Every year some hundreds of pounds are spent by the Department on up-to-date equipment for telephone exchanges, but however modern the apparatus or however perfect the construction from an engineering point of view, the results will be nullified by careless or inexperienced operating.

It is only in large towns that schools have been established by the Department for the training of telephonists, and with the development of the telephone system it is essential that these facilities be systematically extended in the Provinces.

The telephone school is controlled by a supervisor specially chosen for the work with the knowledge of telephone matters acquired from practical experience, and the gift of imparting that knowledge to her pupils.

A certain number of hours each day are set apart for lectures during which the operator takes notes. At a later stage in her training she will put this knowledge into practice by operating at a dummy position, while the final period is given up to examination papers to test the knowledge of the operator before she is passed into the exchange.

Everything is done which from the outset will develop an intelligent interest on the part of the operator.

But what happens in the Provincial towns?

A day in the life of a telephone supervisor is usually so occupied in dealing with matters of the moment that she has no time to spare in which to give instruction to learners. She therefore has to do the next best thing and pass her work over to a senior operator. The operator does her best during the time when she is not actually employed in operating to instruct the learner. The learner will be taught the "standard expression" the "opal code," the "registration of calls," the use of heavy gauge circuits, and the avoidance of others for long distance calls, and incidentally picks up the little idiosyncrasies of her teacher, but the "reason why" these things are done is not explained to her, simply because the learner cannot be placed always with the same operator for instruction, and the supervisor cannot spare time from her day's work except for casual supervision.

Take the question of "voice production," which in my opinion is one of the most important features in the training of a telephonist, but, owing to want of time and in most cases to the need of a teacher on this special subject, it invariably has to be passed over except for seeing that the proper sound is given to vowels in pronouncing numbers, and the correct utterance of the standard expressions with the rising inflection.

In my experience I have always found learners enthusiastic and eager to learn. Let advantage be taken then of their enthusiasm, and put them in the hands of experienced teachers where they can acquire more than a superficial knowledge.

In spite of the drawbacks to the present system, the learners are much better favoured than they were in my student days. When I entered the Telephone Service, there were only three operators in the exchange, two of whom were telegraph learners, but who spent part of their day in working the telephonic switchboards.

Supervision in those days was not carried to the fine art to which it is now. My knowledge of telephone matters was acquired chiefly by answering "skins" for doing things which I ought not to have done and leaving undone those which (according to the rule book, which we only looked at on special occasions) I should have performed. I think my maximum was thirteen in one day!

However, experience is a grand teacher, but I should certainly have preferred a more pleasant way of learning.

To come back to the present-day training. In the Brighton district there are about 118 operators employed, yet with this large number there is no school provided for proper instruction.

What I should like to see would be a school established at the centre of each telephone district to be a training centre for all exchanges in the district. For example, we will say that Brighton is the training centre for the Brighton district and any operator required at Worthing, Lewes or elsewhere in the district will attend the Brighton school for instruction, which would be carried on by a supervisor possessing the necessary qualifications.

You will say at once that the idea is far-fetched and that it would be too costly to the Department. That it would be costly I admit, but whatever sum the Department spend in training will be recovered in the efficiency of the service.

I have had brought to my notice during the past year numberless cases of appalling waste of trunk lines through the inexperience of the operators at the small exchanges, cases which I am sure have made the traffic superintendent weep. All this however would be obviated by a course of instruction in the school.

You will say again "Of what use would it be for an operator at Lewes or Burgess Hill to learn the opal code and C.B. working, when their own exchanges are 'magneto'?"

I reply that it would be of the utmost value for these operators at the outlying exchanges to understand the working of their main exchange. With every connexion the operator knows exactly what is taking place the other end, and with this knowledge in her possession she can appreciate any difficulty or delay which there might be. The instruction in these cases could of course be modified, but that is a matter which could be arranged by the local authorities.

The question of interchange and substitution would also be simplified, all the operators in the district being equally qualified.

The preparation of a syllabus and the working out of the necessary details for bringing to fruition a comprehensive system, would form the subject of a conference between district managers, traffic superintendents, and supervisors, and I am confident that the Brighton district would be able to formulate a scheme which would be of inestimable value to the Department.

REVIEWS.

The Venture. A Magazine of Literature and Art.—We have received a copy of No. 10 of Vol. IV of this periodical, which takes as its motto Voltaire's words: "It is a fine thing to write our very thought; it is man's privilege." *The Venture* is ambitious in its scope and varied in its contents, which comprise poetry, drama, essays, criticism and short stories. The poetry maintains a good standard and the critiques are refreshing. The whole reflects credit on members of the Post Office staff who form its contributors.

Mental Efficiency Series. (Ten vols. Funk & Wagnall, 134, Salisbury Court, E.C. 30s.).—We have not the space to review in detail this interesting series whose scope is sufficiently indicated by their titles. They are—"Opportunities: How to make the most of them," by L. Charley. "Common Sense: How to exercise it," by Yoritomo-Tashi. "Personality: How to build it," by H. Laurent. "Poise: How to attain it," by D. Starke. "Practicality: How to acquire it," by R. Nicolle. "Influence: How to Exert it," by Yoritomo-Tashi. "Speech: How to use it effectively." This is a work founded on the teachings of Xanthes, and annotated by B. Dangennes. "Perseverance: How to develop it," by H. Besser. "Timidity: How to overcome it," by Yoritomo-Tashi. The three works which are founded in the teachings of Yoritomo-Tashi are in each case annotated and expounded by M. Dangennes. The Japanese philosopher, who flourished in the twelfth century, was also a great statesman and his teachings had a powerful effect on the minds of his people.

OUR MONTHLY RECORD OF NAVAL AND MILITARY HONOURS.

THE following members of the staff connected with the Telegraph or Telephone Services have been mentioned in despatches or have been honoured by other marks of distinction. The Editor will be greatly obliged if surveyors, superintending engineers or postmasters will, where possible, send him photographs of the officers concerned and any available information with respect to the deeds for which they have been honoured.

Captain W. M. BATCHELOR, Royal Engineers, Signal Service (Assistant Superintending Engineer, Northern District), has been awarded the Military Cross.

Captain (temporary Major) A. S. ANGWIN, Royal Engineers, Signal Service (Assistant Engineer, Engineering Department, West Scotland District), has been mentioned in despatches.

Capt. G. H. COMFORT, to whose mention in despatches we referred last month, joined the Lowland Division Engineers (Territorial) in April 1908, and held the rank of Captain on his transfer to the Regular Army (R.E. Signals) shortly after the outbreak of war. Since then he has served as Officer Commanding Signals somewhere in France.



CAPT. G. H. COMFORT.

Company Serjeant-Major W. WESTERN, Royal Engineers, Signal Service (Surveyor's Clerk, Western District), has been mentioned in despatches.

Second Lieut. A. J. TAYLOR, Royal Engineers, Signal Service (Clerk, Third Class, Engineering Department, South Wales District), has been mentioned in despatches.

Serjeant E. T. BAKER, Royal Army Medical Corps (S.C. & T., Maidstone), has been mentioned in despatches.

Lieut. A. H. BARRY, Royal Engineers, Postal Section (Assistant Surveyor, 2nd Class, North Wales District), has been mentioned in despatches.

Serjeant A. J. BUTTER, Royal Engineers, Signal Service (S.C. & T., Brighton), has been mentioned in despatches.

Serjeant R. COSGROVE, Royal Engineers, Signal Service (Counter Clerk and Telegraphist, London Postal Service, Western District), has been mentioned in despatches.

Second Lieut. R. S. FARQUHAR, Royal Engineers, Postal Section (S.C. & T., Elgin), has been mentioned in despatches.

Sapper A. TATTERSALL, Royal Engineers, Signal Service (S.C. & T., Liverpool), has been mentioned in despatches.

Lance-Corporal J. M. TOMKINSON, The King's Liverpool Regiment (S.C. & T., Liverpool), has been mentioned in despatches.

Acting Company Serjeant-Major F. A. TUFT, Royal Engineers, Postal Section (S.C. & T., Wolverhampton), has been mentioned in despatches.

Serjeant E. P. WARD, The King's Liverpool Regiment, now serving in Royal Engineers, Signal Section (S.C. & T., Liverpool), has been mentioned in despatches.

Second Corporal W. J. SYMES, Royal Engineers, Signal Service (Telegraphist, Central Telegraph Office), has been mentioned in despatches.

Sapper F. G. BRABY, Royal Engineers, Signal Service, (Telegraphist, Central Telegraph Office), has been awarded the Distinguished Conduct Medal.

Acting Serjeant A. R. DRAY, Royal Engineers, Signal Service (S.C. & T., Bristol), has been mentioned in despatches.

Serjeant J. HEIGH, Royal Engineers, Signal Service (S.C. & T., Edinburgh), has been mentioned in despatches.

Petty Officer (1st Class) F. F. LYNCH, Royal Fleet Reserve (Skilled Workman, Class I, London Engineering Department), has been awarded the Distinguished Service Medal. Since the outbreak of hostilities he has been engaged in the arduous and dangerous task of mine-sweeping.



PETTY OFFICER F. F. LYNCH.

Serjeant J. McILWAIN, Connaught Rangers (S.C. & T., Newcastle-on-Tyne), has been mentioned in despatches.

Sapper W. C. McCLELLAND, Royal Engineers, Signal Service (Unestablished Skilled Workman, Engineering Department, West Scotland District), has been mentioned in despatches.

Serjeant J. H. ROEBUCK, Royal Engineers, Signal Service (Telegraphist, Central Telegraph Office), has been mentioned in despatches.

Serjeant C. F. G. WEINEL, Royal Engineers, Signal Service (Skilled Workman, Class II, London Engineering Department), has been awarded the Distinguished Conduct Medal.

Sapper D. CAMPBELL, Royal Engineers, Signal Service (Unestablished Contract Officer, Telephone Department, Dundee), has been awarded the Distinguished Conduct Medal.

Private F. CLAPTON, Royal Army Medical Corps (Night Operator, London Telephone Service), has been mentioned in despatches.

Corporal S. DORAN, Royal Engineers, Signal Service (Telegraphist, Central Telegraph Office), has been awarded the Distinguished Conduct Medal.

Serjeant F. T. GIBBS, Royal Engineers, Signal Service (S.C. & T. Haywards Heath) has been awarded the Distinguished Conduct Medal.

Corporal C. A. KENNEDY, Royal Engineers, Signal Service (S.C. & T., Elgin), has been awarded the Distinguished Conduct Medal.

Serjeant J. MOFFAT, Highland Light Infantry (Skilled Workman, Class II, Engineering Department, West Scotland District), has been awarded the Distinguished Conduct Medal.

Sapper T. R. TOMBS, Royal Engineers, Signal Service (Skilled Workman, Class II, Engineering Department, South Wales District), has been mentioned in despatches.

Corporal T. W. WATSON, Royal Scots, Lothian Regiment (S.C. & T., Edinburgh), has been awarded the Distinguished Conduct Medal.

Private W. HUTCHINS, Royal Irish Regiment (Night Telephonist, London Telephone Service), has been awarded the Distinguished Conduct Medal.

Sapper A. G. LOCKE, Royal Engineers, Signal Service (Telegraphist, Central Telegraph Office), has been mentioned in despatches.

THE TRAINING OF MALE NIGHT TELEPHONISTS.

BY JAS. MAGNALL (York).

THE training of male night telephonists to provide an efficient night telephone service at exchanges where the employment of such officers is justified, is a matter which should be given as much attention as the training of day female telephonists. In support of that opinion, and bearing in mind the editorial desire expressed in the September issue for a fuller articulation in the JOURNAL of the experience of its readers in the different phases of their work, I should like to give a brief *resumé* of the course taken in Manchester to train men for night telephone operating after the transfer of the local system from the National Telephone Company to the Post Office. Up to that time the night service at Manchester was given by a staff of females—and a good service was given by them—but under the new administration it was decided that the future night service would be given by men.

When the necessary preliminaries had been gone through and the number of men, full-time and part-time, which it was considered would be adequate to meet the demands of the service was decided upon, steps were taken to procure the men.

Attempts were made to procure ex-soldiers and sailors, but owing to the scale of pay it was not a success, and the Labour Exchanges were approached. Their efforts proved successful, and a stream of candidates of all shapes and sizes appeared—all sorts of men were represented, and after sorting them out carefully a number of men were selected. Then the question of training arose and it was decided that a full school training in the particular system of operating each man would have to perform, would be given. Three hours in the operating school for three weeks six nights a week was considered to be time enough to complete the theoretical work—the remainder of the 54 hours per week in the case of the full-time men being spent in practical work, under the direction of traffic officers specially detailed for the work. The part-time candidates were not given practical training during this period, their practical training being given after the school training was completed: three weeks usually sufficed.

It may be mentioned that the men chosen represented many trades and professions: they included carpenters, undertakers, bailiffs, plumbers, hatters, postmen, labourers, carriage painters, insurance agents, clerks, university students, &c. It was found that clerks readily assimilated the school work and became, generally speaking, the most successful operators, although this was not invariably the case.

The order in which the different phases of telephone operating was taught in the school is as follows:—

General.—The object of the telephone and operator. Parts of instruments, with demonstrations. Definition of an exchange. Telephone area. Object of telephone codes. Codes of exchanges in the telephone district. Definition of trunk calls.

Parts of a Switchboard.—Each part of a telephone switchboard "A" position described in detail and the uses of each part explained.

General Method.—Definition of a subscriber, how he is known at the exchange, and the method adopted to call the exchange. Correct method of repeating numbers. Necessity for careful articulation. Use of both hands. Engaged test, &c. Definition of local and junction calls. Team work. Signals, what they indicate. Auxiliary lines. Pegged lines, object and meaning of the different types of peg in use. Ineffective calls, reasons for and how to deal with them.

Monitorial System.—(Brief remarks.)

Originating Junction Calls.—Effective and ineffective order wire, signalling, and ringing systems of working.

Services.—Types of service. Opal code. Party lines.

Ticket Recording.

"B" Operating.—Parts of switchboard described and explained. Different methods of operating explained.

Traffic Records.

General Instruction.

The curriculum as shown is, of course, only general: any attempt to supply the details would be a lengthy business and would be rather tiresome to the reader.

Experience showed that most of the candidates had lost their facility of writing, and after the first evening's work it was decided that notes on the subject of the lecture would be slowly dictated. The three hours were usually taken up in lecture, taking notes, study, and answering questions (on paper).

The lectures were couched in simple every-day language, and similes in the shape of common objects were found to be very useful in making the men understand the use of many of the pieces of apparatus used in the telephone business. It should be understood that to teach men of ages ranging from 18 to 35 years of age, a new and unique business was not a task which could be called easy. Far more difficult it is to teach men of mature age, who have opinions on general subjects, the fundamentals of telephone operating, than to teach young girls fresh from school.

The advantage of having the outlines of a ticket painted on the blackboard was realised when teaching the male night telephonists in the school.

The answers given to the questions set to the men were interesting, many were very humorous. I give a few selected answers to questions which are, I think, not without interest or humour:

Question.—How would you deal with a call for the "ambulance" from a call office?

Answer.—By Dealing with it in the usual way from a Call Office. But would not argue the Point for "Penny Please" but would get the caller connected as soon as Possible.

Capital P's are a strong point in this case.

Question.—Explain precisely how you would proceed to set up an effective local call.

Answer.—First, subscriber's indicator drops; second, operator sees the number, takes up answering plug, tests line required, if clear inserts plug, draws key in listening position and says, "Number please?" repeats, takes up corresponding plug, inserts if line is clear.

Question.—Explain precisely how you would proceed to set up an effective outgoing junction call (you may omit the answering of the subscriber's call).

Answer.—To set up an effective outgoing junction call, say you wanted to ring New Mills up, you have to ring up Stockport first of all, as there is no direct line from here to New Mills; after you have rung Stockport you ask for New Mills, after giving your number and exchange, they connect you through—thus you have an effective outgoing junction call.

Question.—Explain fully how you would completely deal with an effective local call.

Answer.—First I should be notified by an indicator falling, then I should insert the calling cord in the corresponding jack, then I should pull the listening key toward me and say, "Number please," after receiving same I should repeat same after the subscriber, and then lay hold of the other cord. Then test the number asked for with the plug, and if clear insert it, &c.

I have heard engineers grumble about operators "laying hold" of cords.

Question.—How many systems of operating do you know? Describe how subscribers signal the operator in each case.

Answer.—There are three ways of operating: common battery, magneto and call-key. Subscribers signal the operator by using either of these.

There are many more answers of interest, but I will not weary the reader with any more of them. Many answers were surprisingly good and were worthy of commendation. I say commendation advisedly, as a word of commendation to men who had done well had a good effect, not only in improving the relationship between the teacher and the students but in creating enthusiasm—and enthusiasm in this, as in all telephone matters, is a good thing.

Like the experience of evening continuation school teachers it was found that some “starters” gave up the business before the end of the first week’s work, generally of course the obvious undesirables. It was found that if a class of ten men was formed, generally two of them decided not to proceed with the work or did not turn up at the commencement of the class.

The greatest difficulty experienced was that of making the students learn the standard expressions, and after a time it was found that the best way of teaching this difficult and important part of the work was first of all to explain clearly the necessity for it and then to give it in “small doses.”

It was surprising to find that although the opal code was not easily learned, the ticket recording generally presented little difficulty, and this was attributed to the order in which the subject was approached, *i.e.*, services, opal code and then ticket recording.

To be a successful teacher of telephone operating to men a full, perfect knowledge of the particular system to be taught must be known, and a detailed knowledge of the actual switchboard or switchboards on which the students will operate, is necessary. Each man must be taken separately and his particular merits or demerits carefully dealt with: defects must not be roughly dealt with, but careful and deliberate explanations and demonstrations given.

In this direction it was found that small sketches and straight line and circle diagrams were extremely useful. As a matter of fact, and I am going to be quite unorthodox, simple diagrams on the blackboard were of more use than the demonstration switchboards in the school. These switchboards are certainly useful in their way, but I am of the opinion that to put several types of equipment on one demonstration switchboard does not facilitate the work of fixing the idea of actual switchboard conditions in the mind’s eye of the student.

It has been said by night operators of the old school that a man would become a better operator and learn the work quicker by dispensing with the school, but I am pleased to say that out of some 20 or 30 men passed through the school, they are unanimous in saying that they do not know how they would have managed without it. They speak in the highest terms of the school training.

The difference between a switchboard and a school-trained operator becomes painfully apparent when the operators are placed side by side on a new switchboard.

In conclusion, I may reiterate that I consider that the proper school training of night telephonists is every bit as important as the training of day telephonists, and I look forward to the time when this can be arranged, even although it may mean expenditure in travelling to a centre where a school is justified.

RETIREMENT OF MR. A. PERKINS.

We regret that pressure on space has caused some delay in recording the retirement of Mr. Alfred Perkins, District Manager at Bristol. Mr. Perkins joined the British Telegraph Manufacturing Company in 1875, and the United Telephone Company in 1880, so that he has had 40 years’ connexion with telegraph and telephone work. After being the Engineer for London North of the Thames, Mr. Perkins was appointed District Manager at Bristol in 1906, which post he held at his retirement.

A presentation was made to Mr. and Mrs. Perkins by the Bristol staff on Oct. 15 last, speeches being made by Mr. E. A. Prout (Acting District Manager) and by Mr. Henry Fedden (late Local Director of the National Telephone Company). Mr. Perkins expressed his regret at giving up work and said that he was as interested as ever in the development of the Service.

LONDON TELEPHONE SERVICE NOTES.

As a consequence of our digression last month into matters affecting the “L.T.S. Christmas Parcel Fund,” we are now faced with serious arrears so far as the telephone societies’ meetings are concerned. What remains to be said of the December gathering of the T.T.S. after it has been dealt with by “J.J.T.” in the “T.T.J.”? Very little but to endorse all his remarks on the success of the evening. For our part we have never read any paper that we have enjoyed more than that of Mr. Coase or listened with more amusement to any remarks than to those made immediately after the reading of Mr. Mead’s contribution. We noticed that the Chairman was at pains to assure the company present that the papers to be read were *ex parte* statements of the matters with which they dealt. Any such disclaimer was certainly unnecessary so far as concerned the remarks of Mr. Mead’s critic! We shall hope to see some correspondence in the JOURNAL on the subject of phonograms.

The January meeting of the Telephone and Telegraph Society saw a return to the regular order of one paper per meeting—on this occasion a dissertation by Mr. F. C. Cook of the Accountant-General’s Department on the “Correlation of Public Administration and Finance.” The paper was the production of a student and would justify the closest study.

The January meeting of the Telephonists’ Society was occupied by a paper entitled “Tone,” read by Miss Ball, of London Wall Exchange, and by a debate on the “Staffing of Information Desks by Telephonists or Supervisors”: the leading parts in the debate being sustained by Mr. Jacob and Miss Reid respectively. “Tone” was an essay which would, we fancy, have delighted the hearts of the editors of the National Telephone Company’s journal. It breathed a spirit which was happily reminiscent of contributions to the pages of that magazine—a prize essay, it thoroughly deserved the prize. The debate provoked a large amount of discussion and Miss Heap, who was in the chair, had the satisfaction (not vouchsafed to all chairmen) of seeing one speaker after another rise without delay to carry on the argument.

The Croydon Telephonists’ Society held their first meeting in 1916 on Jan. 6, and listened to two excellent papers. The first entitled “Small Talk concerning Telephony” was contributed by Miss Hillier of the Purley Exchange, the prize winner amongst the telephonists under two years’ service. The second paper was read by Mr. G. Brown of the Superintending Engineer’s staff. Mr. Brown examined impartially the question “Can Telephonists Maintain Exchanges?” and his opinion was, although they could not undertake the full measure of that responsibility, there were undoubtedly many duties of an engineering character at present in the hands of male staff which could quite well be passed over at this time to properly trained staff, drawn from the telephonists’ ranks. We should like to see the paper in the columns of this JOURNAL.

The male staff to be met with in the Controller’s Office grows daily less, save amongst what one of the absentees in acknowledging a Christmas parcel referred to as the “secluded lairs of the ground floor.” Apart from the large number of men who have joined the military or naval forces, many have gone to lend a helping hand in other Government Departments, including the recently extended Trades Board Offices. But in addition to all these, the L.T.S. is for the moment without a committee to examine what remains of its staff and work. The office seems empty indeed! However, the last committee’s report is now printed and in circulation, so that our corridors should shortly echo to the steps of another body of this august description.

The patients at the Post Office Home Hospital, of 22, Kensington Palace Gardens, consume daily a large number of *smokes*—Players’ Navy Cut to be exact—and the “Museum” Exchange staff have just devoted one of their weekly collections to the purchase of 600 odd cigarettes of this brand and have sent them to the matron for distribution. If any of the other exchanges will follow Museum’s lead in the matter the honorary secretary of the P.O. Relief Fund will greatly appreciate their action and so we may be sure will the *boys* at the hospital.

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising { Mr. JOHN LEE.
Committee - - { Mr. J. W. WISSENDEN.
Managing Editor - - Mr. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

MARCH, 1916.

[No. 18.]

AIR RAID WARNINGS.

WHEN after the air raid in the Midlands an agitation arose for improving the method of giving warning of approaching Zeppelins, Mr. Herbert Samuel suggested to his new Department, the Home Office, that the Post Office Telephone Service could be of assistance.

The scheme which has been worked out will throw a heavy responsibility on all concerned. It will require courage, coolness and dexterity on the part of hundreds of telephonists and supervisors all over the country, sometimes in circumstances of excitement, alarm and even danger. But the Heads of the Telephone Service knew they could rely on the Staff, and they have accepted the duty of transmitting Zeppelin warnings sure that the Staff, recognising that this is a big contribution to the National defence, will not fail their Country.

L. T. H.

THE SILVER LINING.

THOSE of us who have spent a life-time in telegraphs or telephones are bound to look upon reduced traffic with some apprehension. This apprehension is less evident, perhaps, in respect of telephones than of telegraphs since there is every reason to believe that a wide expansion of telephone business will follow the war. But the telegraphs have suffered severely. It may not be the result of the increase of tariff only; the change of so many industries from the more speculative ventures of the past to the manufacture of munitions, where demand is constant, has had its influence and the social utility of the telegraph has clearly been restricted. No one likes to see his craft depreciated in value. The increase of total revenue is something of a consolation, but if that increase is purchased at the cost of checking the growth of the utility of the craft it has an analogy with the classic instance of slaying the goose for the sake of the immediate eggs, and even if the eggs are golden the goose becomes a poor thing—as a future producer. Patriotic instinct bids us face the taxation of telegraphs with fortitude, and certainly this has been evidenced throughout the Service. Even so, as intelligent workers, we shall do well to study the question carefully and to estimate, if we can, what will be the permanent influence on our craft of the set-back. Is there to this dark cloud something of the nature of a silver lining?

At once, let it be said, the Post Office as a whole has become of far more value than ever to the community. In spite of restricted services and of increased charges, the Post Office has widened its sphere of operations. It is doing financial work of such importance to the State that possibly this aspect of its functions may be further extended after the war. When prominent economists tell us that there is an urgent need for a banking system which will fulfil both aspects of banking enterprise, the advancing of money and the gathering of money, with more elasticity and readiness and with more widely extended operations than privately owned institutions have performed these functions in the past, one's thoughts at once fly to an industrial extension of Post Office banking business which will revolutionise the system of credit and will bring the State into closer and more responsible contact with industrial and commercial enterprise. Various suggestions have been made in the public press which would focus themselves in some such development. An American critic gives the Post Office credit for saving the English currency at a critical moment by producing "from its vaults millions of pounds' worth of paper money." The payment of separation allowances and the transfer of money to and from soldiers and sailors have been operations of immense social and economic value, and they will leave their mark. To keep the soldier in the trenches and the sailor on the Dreadnought in touch with their family responsibilities moment by moment is something of a revolution of warfare, and therein the Post Office has done great work, of which the honours will abide. This may seem to be apart from telegraphs and telephones, but the fact is that these, too, have widened their operations amazingly, the difficulty being that the time is not ripe to deal with such extensions in detail. The telegraphist who sighs over declining traffic may extract some comfort

from those widening operations. He can see how the organisation of the country has depended more and more on his craft: he knows that the future of that craft in England must include telegraph and telephone developments of which in 1914 we were unaware.

But there is another consideration. Two books by very different authors have laid stress on the future re-organisation of industry. Mr. G. H. Perris in his *Industrial History* shows us that we shall need a closer bond between industrial enterprises, and that in place of the older competition which was the life of industry (and of industrial telegraphs) there will need to be co-ordination and closer welding. Herr Naumann, in a book which is the talk of Germany at the moment, urges almost the same for German and Austrian industry, though with appropriate cunning he pretends to lay stress on the particular need as regards Austria. It means that communications, which will be the life of this new co-ordination of industries, must be more efficient than they were before the war. Productive enterprises must be in more close touch with markets both for the purchase of raw materials and for the sale of finished goods. Information must more readily be accessible: waste must be more firmly restricted: financial operations must be less individual and more directed to general welfare. The whole world of barter and exchange must be close to the smallest village. And it needs no great profundity of knowledge of economics to realise that this will influence all the means of communication, posts, telegraphs, railways, shipping. Restricted services may be desirable when men are needed for warfare: needs must when warfare drives. But for re-organising industry on the grand scale, when Government control of finance and commerce and industry has become the most dominant factor, there must be such an extension of the usefulness of the means of communication as will open up before us a great opportunity.

There will be debateable issues. In this aspect of the development of native industries the enthusiast for State action can defend a deficit on telegraphs. He can say that the cheap telegram which brings English industry into touch with the demands of a re-organised world is worth while even if it costs the community for a whole year something less than one-fifth of a single day's warfare. On the other hand there may be a conception of telegraph tariffs which will include the cultivation of so much new traffic that the financial burden on the State will disappear. It seems clear, however, that the idea of making a definite money profit to the State from telegraph or from telephone enterprise will be modified, after the war, by the less visible profit which will accrue from the closer organisation of industry generally. Many of our older ideas, born of the mercantile theory of economics, are being jettisoned. The very notion of value is changing, and is being interpreted in language which has regard rather to the welfare of the community at large than to the balance sheet success of individual enterprises. So we may take heart. We have been thrust into sad and sorrowful days. Prophecy is at a discount and economic prophecies have had the fate of being invariably wrong. But there is good ground for hopeful confidence that the Telegraph Service may be galvanised into new life by the change in economic and industrial conditions. To that extent the dark cloud gives evidence of a silver lining.

MIXTURE AS BEFORE.

To attempt to deal in three pages with so complex and contentious a subject as the "Economic Social and Political Conditions in Europe which influence Government Ownership of the Telephone," is certainly a bold adventure. Mr. J. P. Duncan essays this task in the Chicago *Electrical Review*, satisfies himself of the advantages of private ownership, but leaves us, we must confess, unconvinced. It is in vain that he reminds us of the backwardness of France and Austria, of the short hours of service in the majority of Continental telephone exchanges, and of the excellences of the United States. His generalisations are based on disputable data, and his statistical comparisons contribute nothing new to a well-worn theme. He tells us that in Sweden and Denmark, the two European countries whose development approaches nearest to that of America, governmental interference has restricted that development; whereas, in Sweden at least, it is governmental competition which has forced up the development in Stockholm and the surrounding districts, and, as is usual where there is no intercommunication, the proportion of the population using the telephone appears better than it really is. It is rather to the fact that Europe is not America that we must look for an explanation of the great discrepancy between the two continents in telephonic development; different conditions and a more extended telegraphic and postal system in Europe have to be taken into consideration, and further the social conditions of village life in the two continents are in no way comparable.

In reviewing the position in Great Britain, we are told that "the attitude of the telephone employees has apparently changed from that of an employee striving to please his patron to that of an official obeying the commands of his superiors, regardless of the public. From the reports it seems that complaints are now practically ignored and service is much less dependable than in the days when the privately owned company operated." In Europe we are becoming familiar with vague "reports" of this kind. They usually come from Bucarest *via* Zurich or Milan, and we have acquired the habit of waiting for their official confirmation—or contradiction. Had Mr. Duncan done this he would have found that there has been a steady improvement in the speed of answers and a decrease in the number of lost calls since 1911.

Mr. Duncan's article contains one fact which is new to us and which is too precious to be missed. We learn that the much-lauded German organisation has been attained by superimposing that of P. T. Barnum's circus on the original structure of Frederick the Great. This happy combination should account for much. In conclusion we are told that the fundamental function of the Government is to render harmless those who have harmed or seek to harm others. By this simple theory government is reduced to a mere matter of police, and should certainly not control the Mint or the Posts or any public works. It might be argued by Mr. Duncan that to leave the power of coining money and carrying mails in the hands of private individuals would give undue facilities to "those who seek to harm others" and that therefore this power should be controlled by the State. We could argue that the same reasoning applies to telegraphs and telephones, and we think the European crisis would furnish us with all the proofs that we require.

THE TELEPHONE IN THE NEAR EAST.

WE think few of our readers will study Miss Minter's extremely interesting article on "A Traffic Department in the Near East" without mingled pride and regret—pride in a cultural achievement carried out with characteristic British skill and thoroughness, and regret that it should have been interrupted in its vigorous beginnings by the fortunes of war. The absence of telephones in Turkey always left a striking hiatus in the tables of European telephone progress; countries far less important and less developed could boast a telephone system. The Franco-British-American syndicate which obtained the concession for Constantinople laid its plans on a broad basis and few telephone systems have ever been started on so large and comprehensive a scale. The Company was the heir of the experience of a generation of telephone experts, and overcoming with astonishing success the difficulties presented by the mixed races and creeds of the Turkish Empire and the prejudices of Oriental custom they inaugurated the service with the rosiest prospects. Over 4,000 direct lines were joined up within nine months of the opening of the system, and before war was declared on Turkey orders were coming in rapidly. Then came the increasing difficulty in obtaining delivery of the necessary plant and finally the temporary assumption of the system by the Government and the subordination of its usefulness to military control. Not the least interesting part of Miss Minter's paper is that describing her dealings with the native telephonists, and her account of their eagerness to take the first calls and maintain the service at an English standard. We do not wonder that Miss Minter is proud of her staff, who seem to have reflected the greatest credit on her training of them. Interesting also is her description of the unpleasantly acute difficulties of the management during their last few days in Constantinople. We look forward with eagerness and confidence to their return to the scene of their labours and to the extension of the good work to other parts of the present Ottoman Empire.

"OUR NEIGHBOURS" (BIRMINGHAM).

ON New Year's afternoon, in pursuance of a time-honoured custom, the staffs domiciled in the Midland Exchange Buildings entertained 90 of the children who attend the St. Jude's Day School, which is situated next door to the exchange, to tea and an entertainment.

The tea, served by a bevy of "Midland" girls, was all that such a meal should be, the nature and quantity of the viands consumed being such as to constitute a challenge to all simple-life theorists.

The youngsters brought appetites and left both happy and tight, but up to the time of writing no casualties have been reported. This happy consummation is thought to be due in a large degree to the excellence of the subsequent entertainment. The capital lantern slides screened by Mr. C. W. Piggott (Traffic Superintendent) to illustrate the stories of "Cinderella," "Aladdin," "Jack and the Beanstalk" and "Robinson Crusoe," which age cannot wither nor time impair, were enthusiastically acclaimed, and no word of the stories themselves, capably told by Miss Williams and others, was missed, nor were the Nature and comic slides denied their well-merited applause.

While Sister Sue has been busy sewing shirts for soldiers the Midland girls have been acquiring a stock of socks &c. for soldiers' sons and daughters, the "et cetera" included some well made boys' knickers, which will make their owners the "pride of the village."

These articles together with sweets and toys were distributed by the Misses Pope and Williams upon whom devolved the duties of organisation and the collection of funds, and to whom much credit is due.

Throughout the proceedings not a single dull moment was experienced. The vigour of the hurrahs accorded to all concerned suggested that nothing is amiss with the lungs of St. Jude.

The access of pleasure usually associated with the Christmas and New Year's season of the hostesses must surely have been heightened and sweetened by the abundant evidence of the keen delight of their less favoured little guests on this occasion.

HIC ET UBIQUE.

IN welcoming our new Chief, Mr. Joseph Pease, of whom we are enabled to publish an excellent portrait on our front page, we are quite in accord with those Service journals who have expressed their hope that he will walk in the ways of Mr. Samuel.

AN extremely interesting series of articles entitled "The Signallers," by Mr. Boyd Cable, commenced in *Land and Water* on Jan. 27. "In the signallers' rooms," he says, describing the work of the Signalling Company at the Front, "all the fluctuations of the fight were translated from the pulsing fever, the human living tragedies and heroisms, the violent hopes and fears and anxieties of the battle line, to curt cold words, to scribbled letters on a message form. At times these messages were almost meaningless to them, or at least their red tragedy was unheeded. Their first thought when a message was handed in for transmission, usually their first question when the signaller at the other end called, was whether the message was a long or short one. . . . It was not that he (the signaller) did not understand the meaning; he himself had known a line bombed out before now . . . but though all these things were known to him, the words 'bombed out' meant no more now than nine letters of the alphabet and the maddening stupidity of the man at the other end who would misunderstand the sound and meaning of 'bombed' and had to have it in time-consuming letter by letter spelling." He describes the difficulties that arise when the all-important wire becomes disconnected, and the setting out of the repair party. The O.C., he says, scribbled the message and sent it, although he knew the line was cut, thereafter putting it out of his mind. "He did not know how or in what fashion the message would be sent; but he knew the Signalling Company, and that was sufficient for him. In this he was doing nothing out of the usual."

RADIO-TELEGRAPHIC communication has been established across the Atlantic between Louisburg, Cape Breton and Clifden in Ireland. It is worked automatically in duplex, the Wheatstone being employed for transmission and the dictaphone for receiving.

NOT enough has been heard, says the *Daily News* of Feb. 8, of the devotion of the girl telephone operators during last week's excitements. There was reason to believe, and they themselves did believe, that London was to suffer a visitation much more serious than any that had gone before. Yet they remained on duty, many from early morning till midnight, prepared to play their important part with dignity should the crisis come. A policeman outside one of the exchanges in the central area had stopped to listen to the sounds of singing that came from the operators' "rest room." "Have they got a tea party up there?" he asked an official who came out. "No," the man replied, "they're waiting for Zeppelins, that's all."

EXTRACT from a report about a recent air raid:

"I might perhaps mention that two people told me that they quoted the speedy answer which they received to their calls to their families, as an example that other ladies, namely the telephone staff, were not in a panic."

WE recently saw the following endorsement on an official paper about deceased telephone subscribers:—

"The charge should be collected in such cases; but if the subscriber demurs, the claim need not be persisted in. . . ." This may fairly be described as "playing for safety," as the Post Office would have to wait a long time for any demur from a deceased subscriber.

WE have heard of many reasons why the boundaries of telephone areas should be extended; but we know of none stranger than that urged by an hotel proprietor recently, viz., that as his hotel is situated in the London area for liquor control purposes, he ought to be in the London area for telephone purposes.

We don't ourselves see the connexion nor have we yet heard of

any scheme for the supply of liquor in appreciable quantities through the telephone wires.

AN officer back from the trenches, says a writer in the *Weekly Dispatch*, told me this: An officer in charge of a telephone in an advanced position was vainly endeavouring to get an answer from headquarters. After some time he heard a female voice say, "Number, please?" Exasperated at what he thought a bad joke, he said, "Gerrard —," giving his own number in London. The next moment, to his amazement, he heard his wife speaking. Headquarters had been put through to London and their wire had crossed with his!

We can only say to this that we believe such an occurrence is not . . . absolutely impossible.

POST-WAR POLICY IN RELATION TO LABOUR AND TIME-SAVING DEVICES.*

By H. C. GUNTON, M.I.E.E. (Principal Power Engineer).

I.—POST-WAR POLICY: NECESSITY AND AIMS.

ALTHOUGH we are not yet in sight of the end of the war, the necessity has already been recognised of considering the conditions which will obtain at the peace, and of preparing to equip ourselves for the commercial war which will follow immediately in the steps of the war of attrition. If authoritative justification is required for the consideration, at this stage, of post-war problems, it will be found in a recent statement by the Prime Minister, of which the following is an extract:—



MR. H. C. GUNTON.

"His Majesty's Government are fully alive to the great importance of the economic, social, commercial and financial problems that will arise after the war, and I am strongly of opinion that not even our pre-occupation with the immediate and paramount task of ensuring victory ought to prevent us from taking measures to ensure that these problems shall be carefully explored by skilled experts in advance."

Owing to the unprecedented nature of the upheaval there have already been many striking examples of the falsification of forecasts not only on our part but, fortunately for us, on the part of our enemies, and for the same reason it must be extremely difficult to determine even the approximate labour

conditions which will obtain when demobilisation is commenced. We cannot yet decide the size of the armies which it will be necessary to retain, we cannot gauge the effect which military training and the open-air life will have had on those who had been previously kept in office or workshop; the extent to which they will prefer agricultural pursuits either at home or in the Dominions overseas, or the degree of permanence as regards the employment of women which will be necessitated by the temporary abnormal numerical disparity between the sexes: neither can we estimate the length of the interval, if any, before the commencement of a trade boom. There are, however, certain considerations which can more safely be taken into account and amongst them the following may be included:—

(i) This country cannot afford to neglect, even for a short period, to equip herself with the most up-to-date machinery to enable her to compete with her rivals; to do so would be to invite commercial defeat at the hands of her present enemies who have already achieved so much by scientific organisation. Even if we assume that there will be no German capacity for trade left, there will be competition between those who desire to step into her shoes.

(ii) While a mechanical equipment involves expenditure of capital which will have to be carefully watched, it may be the means (owing to the greater facilities afforded by its installation) of avoiding the necessity for expenditure on increased accommodation, and in any case the greater facilities may justify the capital expenditure.

(iii) Although at first sight it might appear that labour-saving devices might militate against the employment of men discharged from the Forces, it is a well-known fact that in commercial establishments nothing serves to attract work so much as the installation of an efficient equipment and that the consequent increased output per man is not accompanied by a decrease in the staff required.

(iv) Incidentally mechanical aids will directly contribute to the absorption of those whom we shall be particularly anxious to protect from distress, viz., the wounded. Many partially crippled men who could not possibly be

employed on work requiring much physical exertion could easily give the necessary attention to a mechanically aided process. The Germans are already designing what may be described as electro magnetic hands for use by those who have lost their arms.

(v) Wherever possible, advantage should be taken of the period immediately following the end of the war in order to improve equipment. This course will not only enable the fullest advantage to be taken of a subsequent trade boom but will facilitate the prevention of a sudden cessation of work at factories which have been devoted to munitions. The ideal which should be aimed at would appear to be to so organise the readjustment of labour which will be rendered necessary by the reduction of the Forces and the closing down of munition works that the process shall be sufficiently gradual to prevent distress and that the outlay incidental to this condition shall be made productive by the manufacture of equipment which will help us to recover from the effects of the war. In other words the manufacture of munitions for commercial warfare would take the place of the manufacture of munitions for military warfare so soon as a sufficient reserve of the latter was available.

These considerations are no doubt receiving full attention on the part of those responsible for the administration of the establishments concerned, but are referred to as they should affect the policy of this Department as regards mechanical equipments.

(vi) Leaving the general application of these principles and coming to the particular case of our own Department, it is necessary to remember that trade activity and the services rendered by the Post Office react on each other very closely, and if the Department, by any increase in the efficiency of its processes can increase commercial facilities, the national interests are very effectually served thereby. The cost, therefore, of any mechanical appliances which would result, for instance, in the more rapid circulation of telegrams or in a reduction of the interval of time between a collection and the departure of the mail train, would be infinitesimal as compared with the gain in the national sense.

(vii) It follows from the above considerations that a broad and comprehensive view should be taken when considering the advantages of labour and time-saving devices, and the effect of capital and maintenance charges, including the cost of energy consumption, on the cost of the work done per man per minute is by no means the only consideration.

II.—MECHANICAL AIDS IN THE POST OFFICE.

In the time and space available it will only be possible to refer to a few of the devices which have been recently introduced in the Post Office. These devices may be defined as those aids, such as transportation, which, although they may depend on electric power, are mechanical in their application as distinct from devices which involve, or are used in connexion with electrical transmission as exemplified by the telegraph and the telephone. Descriptions of some of those appliances have already been published,* but the opportunity has been taken to bring the information up to date and to place it in its proper relation to the policy dealt with in this paper.

TELEGRAPH INSTRUMENT ROOMS.

Conveyors.—Any attempt by mechanical means to effect a reduction in the time of circulation, or in the amount of human labour employed for collection and distribution purposes, in a telegraph instrument room must fulfil the following conditions:—

(i) The system of mechanical appliances should, as far as possible, be uniform throughout the instrument room, and the control should preferably be concentrated at a central point.

(ii) The apparatus must be automatically selective as regards distribution to the operators, i.e., it must be possible to despatch a telegram form to any desired point on any table. The forms must also be conveyed from any point on any table to the check table, but this is not a selective operation.

(iii) The despatch of the telegram forms by the various operators should not involve any further break in the continuity of their work than is at present involved by the placing of the forms on the message baskets provided, and from which the boy messengers collect.

(iv) The apparatus must be silent in its operation, and moving parts must be arranged so as to obtrude to the smallest possible extent on the vision of the operators.

(v) The gangways and the lighting of the instrument room should be interfered with to the smallest possible extent.

A complete equipment has been installed experimentally at Birmingham. "Pick-up" carriers bring the incoming telegrams from the various operators' stations and drop them on to the band conveyors, which deliver them at the "check" table, whence they have to be distributed selectively to the operators who deal with outgoing circuits. This selective distribution is effected by placing the telegrams on tablets arranged vertically in groups of five or six corresponding to the various stations on each table.

The endless cord running between the "central check" and each table draws the selective carriers, the jaws of which, by means of ramps, are made to open and close and so pick up the telegrams only from their proper tablets and similarly to deliver them only at their proper stations. The carriers also pick up at the table stations and deliver on to the bands at the check

* The author's paper on "The Employment of Power in H.M. Post Office," read before the Institute of Electrical Engineers.

"The New House Tube System at the C.T.O.," by Mr. E. H. Walters, in the *Institute of Post Office Electrical Engineers' Journal*, Vol. VII (page 189).

Paper by Mr. H. P. Brown in the *Institute of Post Office Electrical Engineers' Journal*, Vol. IV (page 209).

* Paper read before the London Telephone and Telegraph Society, Feb. 7, 1916.

table referred to above. The carrier installation has been supplied by Messrs. Jamson, while the band conveyors have been installed by the Engineering Department. The cord and band conveyors are driven by electric motors placed underneath a platform at the "central check."

The results obtained with this experimental installation have been so satisfactory that a similar scheme is in course of preparation for the Manchester office. There is no doubt that in cases where, owing to local conditions, the time of circulation is above the average an appreciable reduction in the time of collection and distribution can be effected. Moreover, it is possible to displace boy labour to a large extent, while perambulation in the gangways is reduced to a minimum.

Pneumatics Tubes.—Members of this society are already aware of the extensive use which has been made of pneumatic tubes to connect up separate telegraph offices and different positions in the same office. Many improvements in details of the equipment have recently been effected but for the purposes of this paper it will be sufficient to draw attention to the advantages of one of the latest systems which is suitable for house tubes through which the traffic is continuous over considerable periods.

The tubes are connected in loops and a continuous current of air is maintained in each loop by means of a comparatively low vacuum. The carriers are inserted either in a funnel at the open end of the tube, or at other points through spring-closed flaps or doors, and are discharged at the delivery end through a flap. The carriers move in a stream at close intervals and no signal apparatus is required, although it is the practice to send through a specially coloured carrier at regular intervals to serve as an indication that all is clear.

This system has been adopted on an extensive scale in the Central Telegraph Office, and this installation was referred to in Mr. Dunford's recent paper before this society. As compared with the system which it is displacing the number of operations connected with the despatch and receipt of a carrier has been reduced from eight to three, the total space required is one-quarter and the total time of circulation can be reduced by something like 50 per cent., while the power required is also much less.

A modification of this system to adapt it for intermittent work includes a remote control starting switch to enable the motor pump in the power room to be started from the operating room.

TELEPHONE EXCHANGES.

Pneumatic Service.—Pneumatic power has recently been employed in the London Trunk Telephone Exchange for distributing, between certain points in the exchange, the tickets on which are entered particulars of the trunk connexions required. Instead, however, of using tubes of circular section and carriers such as are used in the system which has just been referred to, the tubes are of rectangular section, $2\frac{1}{2}$ inches by $\frac{3}{4}$ -inch, and the tickets are propelled through them by means of a folded end at right angles to the remainder of the ticket, which practically serves as a sail when pressure is applied and which also enables the ticket to be drawn through the tube when a vacuum is applied. The tickets are conveyed from various operators to a distributing centre by vacuum, and are thence dispatched by pressure to other operators; at the distributing centre the tickets are discharged without destroying the vacuum by means of two electrically-driven rollers which, except during the passage of the ticket, are kept in contact by springs on their axes—the tickets are also inserted in the vacuum tube by means of an arrangement which reduces the opening to the atmosphere to a minimum. The dispatch from the distributing centre is effected by placing the ticket in a receptacle and afterwards applying the pressure by means of a valve actuated by a plunger which also lights a signal lamp. The ticket on being discharged strikes a lever which breaks a contact which has the effect of de-energising the electro-magnet in connexion with the pressure valve, and so cuts off the pressure from that particular tube and extinguishes the lamp.

The system, which was brought to the notice of Major O'Meara and Mr. Preston during their American tour, has been installed by the Western Electric Company and has materially contributed to the efficiency of the trunk exchange.

Arrangements were being made to equip one of the provincial exchanges on the same system—on an experimental scale in the first instance owing to somewhat adverse local conditions—but the increase in cost due to the war has caused the work to be postponed.

Vacuum Cleaning Tools.—Another way in which a mechanical aid contributes, although indirectly, to the maintenance of good traffic conditions is by means of specially designed vacuum cleaning tools which enable the exchange equipment to be kept clear of dirt with the minimum expenditure of labour. Cleanliness is particularly important in the case of automatic exchange apparatus.

As compared with other branches of the service, however, the telephone exchange does not provide much scope for mechanical aids other than those which are inherent to the telephone switching equipment, and the principal ways in which the power engineer can improve the amenities are by means of efficient lighting, heating and ventilation.

LETTER SORTING OFFICES.

Conveyors.—The letter sorting offices in the larger postal centres offer a very wide field for the operations of the engineer, for while there are certain selective processes which can only be carried out by human agents, there is scope for mechanical transportation between the processes. Up to now the conveyors which have been used in sorting offices have been installed in order to facilitate operations carried out more or less in accordance with existing ideas. The difficulties in design involved in adapting these appliances to these operations in old offices, constructed and arranged without reference to their embodiment, have, of course, been very considerable.

The practicability and utility of conveyor bands from the posting boxes to the facing tables and to carry letters from one end of a facing table to the other has already been demonstrated, while inward and outward bag conveyors have proved of great value both as regards labour and time in handling made-up bags. Fig. 1 is a view of the bag conveyor in the Foreign Section at King Edward Building.

Experiments have recently been made which aim at the mechanical transport of correspondence practically right through an office, and in addition to the transportation in connexion with the posting boxes and the loading platforms the following processes are affected:—

- (1) Facing and separation of newspapers, &c.
- (2) Conveyance to stamping machine.
- (3) Stamping.
- (4) Conveyance to primary sorters.
- (5) Sorting.
- (6) Conveyance and stacking in divisions.

In 1910 an experiment was made to determine how far it would be possible to pass correspondence from the facers through stamping and stacking machines without intermediate handling, this being an extension of the idea already worked out in America whereby the faced correspondence was stacked, as exemplified by the "pick-up table" which was later installed at King Edward Building. The experience gained by the preliminary rough experiments also suggested an arrangement for sorting into slots and for the conveyance and accumulation in separate stacks of the letters forming each division.

The first of these ideas, viz., a table on which the facing, stamping and stacking could be carried out in one operation, proved to be a success when tried on a practical scale at Liverpool, and an improved table of this type

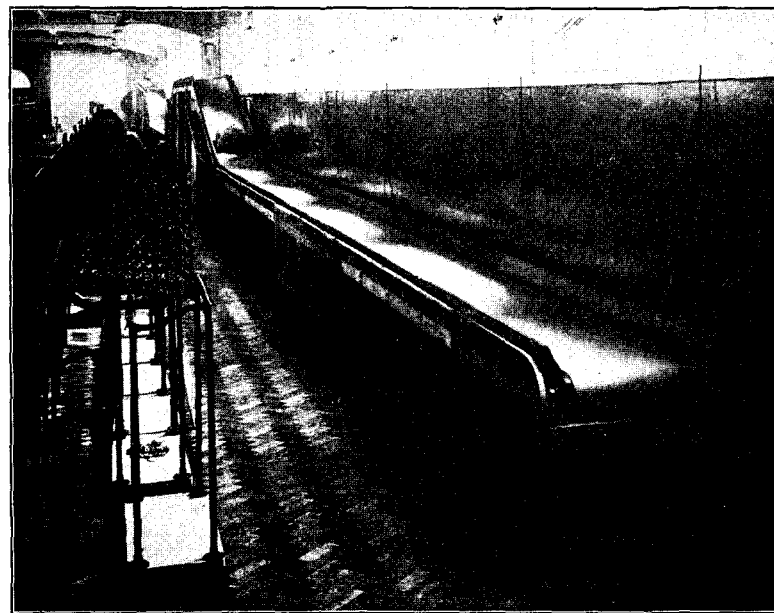


FIG. 1.

is about to be installed at Manchester, while the same principle is being applied in King Edward Building by means of a modification and extension of the equipment of the American "pick-up table" which, as originally installed as a machine for stacking only, did not prove to be an entire success.

The experimental table at Liverpool has along its edge a series of slots formed by smooth sheet iron or wood, through which the facers drop the letters, in an upright position, on to a running band below the table. Each of these individual slots forms a "siding" leading to a main slot which runs from end to end of the table, and into which the letters pass without "fouling." At the end of this main slot the letters are mechanically separated and fed direct into the stamping machine and then "stacked" by the mechanical stacker which forms part of the machine.

As an alternative arrangement each small slot or "siding" is fitted with its own stamper, consisting of an impression roller and die and the letters are automatically stacked at the end of the table.

The short letters will be stamped and stacked in the same way as in the case of the first of the alternative methods tried at Liverpool; the long letters will be conveyed in the separate slots next the edges of the table to automatic stackers while bulky letters, packets and newspapers will be thrown on to an overhead band for transference to the end of the table and thence on to an under-floor conveyor.

The second of the main ideas originated in 1910, viz., the sorting of letters into a grid and their conveyance by a band moving beneath slots corresponding to the different divisions, and the stacking at the secondary sorting positions, while it pointed the way to further developments, was not considered to have justified itself having regard to the amount of space needed, the limitations in the number (24) of divisions within reach of the sorters, and the cost.

So far, therefore, the possibility of successfully combining processes 1, 2 and 3 had been demonstrated.

Experiments were next made to investigate the possibility of combining processes 1, 2, 3, 4, 5 and 6 in one fitting; in order to keep the apparatus as compact as possible it was decided to stack the primarily sorted letters at the end of the fitting instead of carrying them right on to the secondary sorter divisions. These rough experiments gave promise of such striking results as compared with what could be achieved by the separate combinations (1, 2 and 3) and (4, 5 and 6) that it was decided to follow the matter up.

In the meantime Mr. Doherty, of the Manchester G.P.O., had been working on an apparatus for combining processes 4, 5 and 6, and an inspection of his apparatus suggested a modified method of carrying out one of his ideas which, embodied in the experimental apparatus for the combination of processes 1, 2, 3, 4, 5 and 6, facilities the solution of this problem as regards the number of divisions which can be served.

An experimental model has been made in the Engineering Department which, although it does not exactly represent the arrangement which would be installed in a permanent installation, has enabled the principle and practical details to be thoroughly tested and demonstrated.

The unfaced mail would be placed in the troughs which are provided for the purpose, so as to be within easy reach of the sorters. The newspapers and packets would be thrown on to a moving band at the top of the fitting and would be carried to one end and either collected in a basket or passed down a chute to an under-floor conveyor according to the local requirements.

Long letters would be faced, stamped and stacked together at one end of the fitting.

The short letters would be faced and sorted in one handling and transported to the combined stamping and stacking elements at the end of the fittings, from which they would be collected and distributed by hand for secondary sortation.

It will be seen that the intention is that instead of a letter having to pass consecutively through six different stages involving several different fittings, viz., facing table, stamping machine, and sorting table, and the transportation between them, it will be picked up at a combined facing, sorting and stamping fitting, will be faced and sorted in one handling, and will emerge from that fitting as a faced, primarily sorted and stamped letter.

Naturally the combined operation of facing and sorting the letter will be slower than either facing or sorting regarded as a separate operation, but it will be obvious that the handling under these conditions may be considerably slowed down and yet show a marked saving of time and force, or both, as compared with the present methods, provided the new apparatus works satisfactorily.

It may be urged as a drawback to the proposed arrangement that so many stamping elements, each with its own die, are required, but if an arrangement is provided such as would be proposed in the case of a permanent installation, for quickly adjusting the type, this would not be a serious additional operation, while the advantage of a separate stamping element for each division, viz., comparative immunity from "misses" would be obtained, and, after all, the additional complication rendered necessary by combining the stamping element with the stacking element is not great. The whole machine has, in fact, been designed with a view to simplicity of construction.

While the author felt that this paper would not be complete without a reference to these investigations which are being pursued in collaboration with the Postal Traffic Managers, Messrs. Cooke and Pugh, it should be understood that the apparatus is still only in the experimental stage and is at present under trial. The reasons for attaching considerable importance to these experiments will, however, be understood from the following figures:—

As a result of tests made at Liverpool when dealing with the principal evening collection by the existing methods, i.e., without any mechanical aids, the number of items of mail matter dealt with per man per minute was about eighteen, including facing, stamping, primary sorting and all incidental transportation, whereas it appears from the experience so far gained that the number of items per man per minute which could be dealt with by using the new apparatus will be not less than 30, an increase of 66 per cent. Fig. 2 represents the essential differences between the processes in a diagrammatic manner. This diagram shows clearly how small, although useful in itself, is the gain which can be achieved by combining processes 1-3 or 4-6, as compared with the gain due to combining 1-6.

The diagram has, however, been prepared at this stage merely to demonstrate the general nature and extent of this gain, and the actual figures will be subject to modification as the investigation proceeds further. It is thought that this method of analysing the performance of an office could be applied with advantage to many large offices.

It will, of course, be necessary to investigate these comparative results very carefully and critically before arriving at definite conclusions as to how far the cost of the apparatus would be justified.

PARCEL SORTING OFFICES.

Conveyors.—Another direction in which collaboration with the postal traffic experts is promising to yield good results is in the parcel sorting offices. Anyone who has visited one of these offices cannot fail to have been struck by the amount of human labour absorbed by the movement of the receptacles between the processes and by the congestion which occasionally occurs. A design has recently been got out which is illustrated by Fig. 3, and which aims at transporting parcels by means of a system consisting partly of gravity chutes and partly of conveyor bands from the openings in a raised platform on which the primary sorting will be done to appropriate positions on the floor below on which the next and final sortation will be effected. It will be seen that the incoming bags will be conveyed to the raised platform, before

being opened, by a sloping conveyor and that the outgoing bags will also be taken to the loading platform by similar means.

It will be clear that the orderly and expeditious treatment of the work will be greatly facilitated by a scheme on these lines and that it will be applicable to any parcel office of considerable size in which there is sufficient head-room.

In one form or another postal conveyors have, within the last few years, been installed at nine Metropolitan and eighteen Provincial offices.

GENERAL SERVICE.

Electric Lifts.—A good example of a labour and time-saving appliance is furnished by the electric lift which is, however, so generally recognised as an essential part of the equipment of any Departmental building of considerable size that it will not be necessary to dwell upon its importance.

In the case of a battery of such lifts a saving in the staff required to work them can be effected by adopting the "push-button system" of control, as is being done at certain stations on the "Underground" Railways. The Post Office has recently decided to employ what is known as the "fully automatic control system" where the local conditions are favourable. These

DIAGRAMMATIC COMPARISON OF SORTING OFFICE METHODS

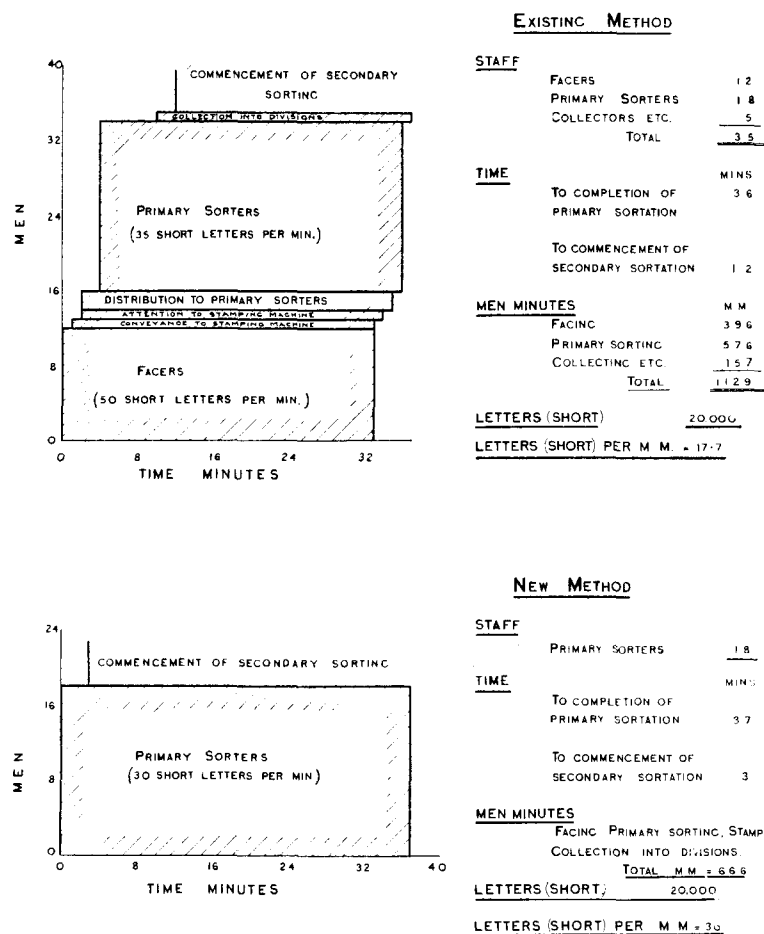


FIG. 2.

lifts are designed and constructed so that the cage may be brought to any desired landing by pressing an electric button on that landing. On the arrival of the cage, but not before, the landing gate may be opened and the lift entered, and as soon as the landing gate and cage gates are closed the pressure of a button in the cage corresponding to the floor to which it is desired to travel has the effect of automatically starting the lift and bringing it to its destination without further attention. By the use of this system a lift may be used by the public with safety, and the need for a lift attendant disappears, thus eliminating a considerable part of the annual charges in respect of the lift.

No doubt, in future, the possibility of employing semi-crippled men will affect the decision as to what system of control should be employed.

EXTERNAL SERVICE.

Electric Trucks.—In a considerable number of cases postal sorting offices are only separated by short distances from the railway stations from which the mails are received and despatched, and transportation either involves considerable human labour or conveyance involving additional handling and at a cost out of all proportion to the distance traversed.

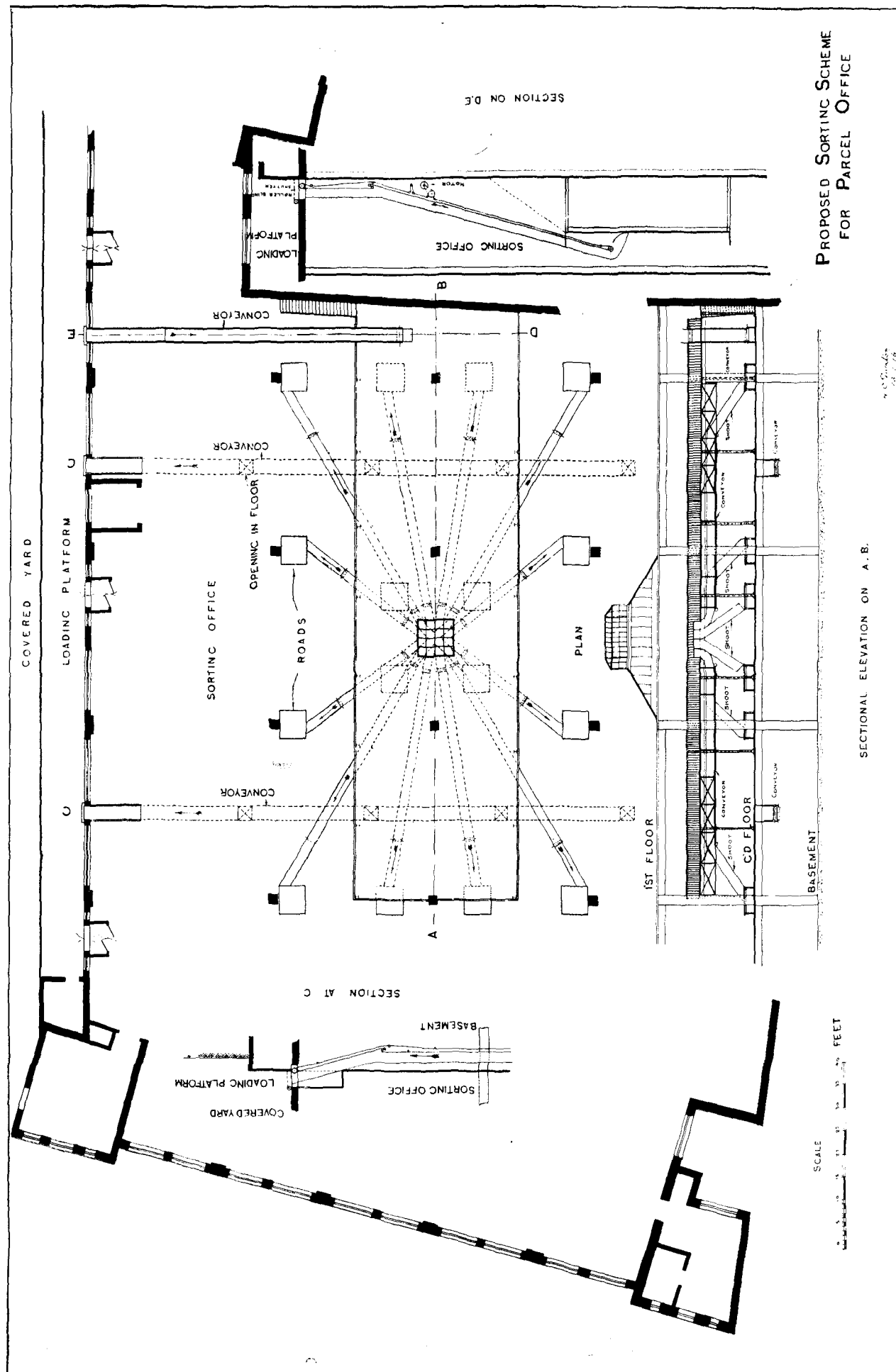


FIG. 3.—PROPOSED SORTING SCHEME FOR PARCEL OFFICE.

With a view to meeting the requirements in such cases in a more efficient manner, trials have been made with electric trucks equipped with batteries, and have been fully justified by the results obtained. Whereas a man can seldom haul a truck at a rate exceeding two miles an hour, these electric trucks have been designed to work up to three times this speed and as the control is sufficiently flexible to meet the conditions of a crowded platform, while slopes as steep as one in ten can be negotiated, they can in many cases be used between the sorting office floor and the mail van on the train. Two of these trucks, each of which weighs about 25 cwt. including a load of 10 cwt. are at present employed in this manner between the Paddington District Office and the trains, two similar trucks are in use in connexion with the Temple Meads Station and Parcel Office at Bristol, and a fifth is held in reserve as a spare and for experimental purposes.

In some cases the inadequate nature of the existing facilities has led to proposals to construct tunnels containing railways or conveyors between the postal and railway premises, but the electric trucks will afford a cheaper and more complete solution of the problem.

At one time it was feared that the railway authorities might object to their use on the station platforms, but, so far from this being the case, they are themselves employing them for the conveyance of luggage.

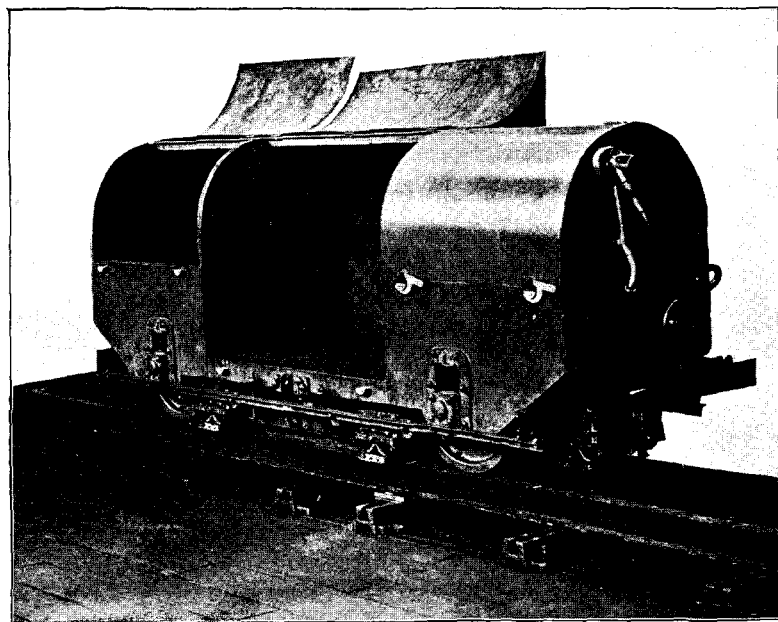


FIG. 4.—TRIAL WAGON.

We have had a certain amount of trouble in connexion with the maintenance of these first trucks, but the elimination of this trouble in the case of future trucks will present no difficulty.

It is possible that there may also be a useful field for light electrically propelled vehicles for collecting from sub-offices and street pillar boxes.

POST OFFICE RAILWAY.

Although the time has not arrived when a complete description can be given, some reference must be made in this paper to the railway which, as members of this society will be aware, is in course of construction for labour and time-saving purposes in connexion with the London Postal Service.

A complete scheme has been worked out in detail in collaboration with the London Postal Service and with Mr. Dalrymple-Hay, who is responsible for the tunnelling, and in consultation with Sir John Snell who, together with the Engineering Department of the Post Office, will be responsible for the electric equipment. No detailed description of the electrical system can be given at the present date for, although the system which has been worked out will form the basis of the invitations to tender, the way will be left open for alternative proposals, one of which it may be advantageous to adopt. The following particulars can, however, be given and may be of interest.

The railway included in the scheme which is now being proceeded with will connect the Paddington District Office and the Eastern District Office with intermediate stations at the Western District Parcel Office, at the Western District Post Office, at the Western Central District Post Office, at Mount Pleasant Sorting Office, at King Edward Building Post Office, and at Liverpool Street Station. Three of the stations, viz., the Western Central District Office, Mount Pleasant, and King Edward Building, will form important junctions when extensions to the north and south are undertaken.

A station will consist of an island platform arranged in two sections, between which will be placed a control cabin and the lifts and conveying appliances that have been specially designed to suit the different classes of postal matter which have to be dealt with between the station platforms and the postal buildings above. This is the general design of station which has been adopted in all cases, the arrangement of the tracks and of the conveying appliances being adjusted to suit the requirements at the different points.

The underground postal railway stations at Paddington and Liverpool Street will be connected by conveyors and lifts with the railway companies platforms.

Between the stations the railway will consist of two tracks, each 2 feet gauge, one for east-bound and the other for west-bound traffic, and contained in a single tunnel of 9 feet internal diameter.

The trains will be operated without drivers on the remote-control system. They may consist of one, two, or three wagons and as they come to rest in, or pass through, the stations they will not need the continuous attention of the switchman.

The position and destination of each wagon will be notified to this officer, who, by means of small levers in the cabin, will set points for the particular route desired and will energise certain sections of the line with the appropriate current. The wagon will then come to rest at the proper section of the platform, or will run through the station without further attention. The operation of the points will be interlocked with the application of the current, and there will be a complete interlocking arrangement between the different routes.

The proposed system of control may be briefly described as being generally similar to the power-operated point and signal systems adopted for modern railway undertakings, but with the signal element replaced by the application of power. It is only by such a system of complete interlocking that a remote-control electrical railway of this scope can be safely operated.

The model illustrates the general method of controlling the trains in the case of a simple station, but it should be understood that at the junction stations the simultaneous passage of several "through" and stopping trains will be possible.

The railway will not only result in a considerable acceleration of the conveyance of the mails between the railway stations and the different offices, and enable these mails to be handled with the minimum expenditure of labour, but the removal of the mail vans from the streets will contribute towards the relief of congestion.

The whole scheme and method of operation has been designed so that it can readily be extended to link up with the other railway stations and offices comprised in the ultimate scheme, and it appears unlikely that there will be any considerable delay in taking advantage of this fact when once the facilities afforded by this complete mail transportation scheme have been demonstrated.

Fig. 4 shows a view of the wagon with which trials were carried out on an experimental track, which enabled important points in connexion with the permanent way and the control system to be investigated.

A view (Fig. 5) is also given of the general arrangement of the station at King Edward Building.

Some indication has been given of the extent to which mechanical aids of the type which come under the definition which has been adopted have been installed or planned, but which is nothing compared with the amount of work which is waiting to be done on a much more comprehensive scale. Moreover, in cases where no actual saving can be quoted as the result of the installations, it is a significant fact that the users in almost every case declare that they would not be without them on any account.

III.—THE PRACTICAL APPLICATION OF THE POLICY OUTLINED.

It will now be useful to consider the best method of procedure to adopt in order to give effect to the policy which has been suggested in part I, especially in relation to those schemes, some of which have been referred to in part II, which are likely to give the most valuable returns.

As a result of the past six years' experience it is suggested that the following general principles should be kept in mind:—

(i) Owing to the very special nature of the Department's operations and the time necessary to study and appreciate the requirements, it is very seldom that a new device suggested from an outside source can be adopted without modification or without embodying auxiliary machinery. Even in the case of the "pick-up" carrier installation, for which standard apparatus is largely used, success was only assured by arranging in the first instance for modifications in details and by combining with the carrier lines a system of band conveyors. It will not be necessary to quote specifically the extremely ingenious but somewhat wild schemes which are occasionally brought to us with a confident assurance that they will solve our problems outright.

(ii) As regards schemes worked out inside the Department, it is seldom that those who are actually employed on any existing process, and who are in the best position to know the local requirements, have a sufficiently comprehensive knowledge of the general requirements or the necessary technical training and experience to enable them to put forward practicable schemes. There are, of course, exceptions to this rule also.

(iii) Even in the case of those traffic and engineering experts whose duties enable them to form a more comprehensive view of general requirements, these officers are very unlikely, acting independently, to arrive at any conclusions which take sufficient account of each other's aims and difficulties: acting together, however, they should be able to achieve much if, at the same time, they take proper account of local conditions. During such collaboration an engineer should realise that the means suggested by him must not jeopardise the reliability of a traffic operation or interfere unduly with the amenities of an office. On the other hand the traffic authority, when indicating the requirements, will help the engineer to produce the best results by leaving to him, as far as possible, the nature of the contrivance to be adopted.

It is true that by the association of the traffic and engineering experts in working out a new idea, the former is not perhaps available to the same

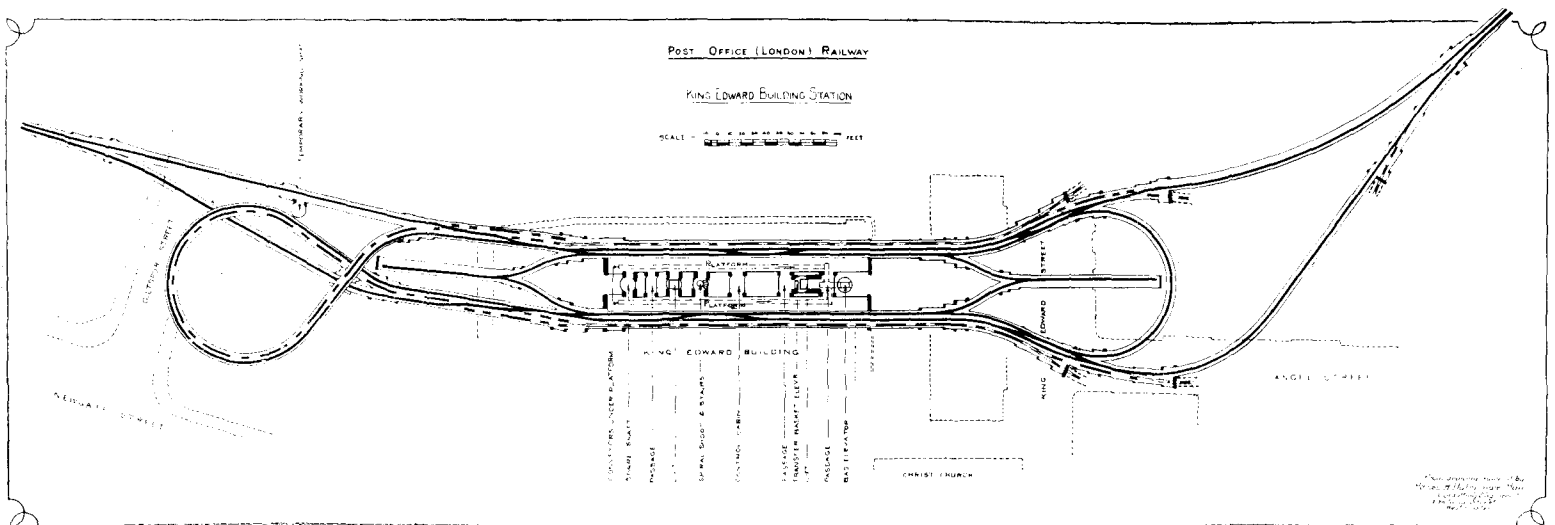


FIG. 5.

extent as an independent critic of the latter, but collaborative constructive co-ordination which provides for the rejection at an early stage of false data and assumption, is really what is required and not detached criticism which, because of its detachment, is likely to be misunderstanding and unnecessarily destructive criticism.

But while the co-operation of the traffic authority and the engineer facilitates the working out of new ideas and the introduction of mechanical aids in existing offices, something much more in the way of organisation is required in dealing with the design of new offices. Unless the views of the general traffic expert, the local traffic requirements, the available site conditions and the views of the architect and the engineer are all available and carefully co-ordinated by the administrative authority in the very earliest stages in the design of a new office, it must be impossible to produce the best results, just as it would otherwise be impossible to produce them in the case of a railway terminus or to quote what is probably the best example of the results of co-ordination in its highest form, the modern battleship. Unless proper provision for the introduction of mechanical appliances is made in the first instance, their embodiment at a later stage is not only likely to be crippled but also to involve unnecessary expense in alterations to the structure, or to other services.

In the adopted report of the Committee on Fittings, &c. (1911), the following paragraphs occur:—

“Co-ordination of Postal, Engineering and Structural Requirements.”—Our examination of the question of lighting, and of mechanical conveyors, to which reference is made in a subsequent section of this report, has led us to the conclusion that in the designing of large offices it is necessary to take a broad and complete view of the numerous problems involved, and we are convinced of the necessity for co-ordinating the postal, engineering and structural requirements at an early stage in each case.

It is obvious that, if the plans of a sorting office, for example, are settled on the assumption that only the existing methods of sorting will be employed therein, it may be difficult, subsequently, to instal mechanical appliances to the best advantage; and it has been suggested that, in the case of every large new office, the Post Office Surveyor and Engineer as well as the Office of Works' Architect (and Engineer, if necessary) should meet at an early stage to consider whether mechanical appliances could be usefully and economically employed, and what structural arrangements would be necessary to that end. By this means it would be practicable to select and leave unobstructed the best possible routes for mechanical conveyors to follow, and much subsequent difficulty and expense might be avoided. We strongly recommend, therefore, the adoption of the general principle that, in the case of every large new office or extensive enlargement of an existing office, there should be a due co-ordination of the postal, engineering and structural requirements before the plans are finally settled.”

It is, therefore, clear that the principle of co-ordination in relation to the introduction of mechanical appliances has already been recognised in some measure, and as the knowledge of the advantages of these appliances spreads the demand for them increases, but there is, in the author's opinion, still too much of the accidental element in the initiation of these schemes and some more effective form of investigation is required.

The suggestion which the author particularly desires to make and to emphasise in this paper is that immediate steps should be taken to apply the principles which have been referred to, by means of the concentrated and continuous attention of a body fully representative of the different interests and functions involved, and dealing not only with improvements in existing offices but with the design of new offices and extensions.

Such a body, if properly constituted, would ensure the complete co-ordination, at the proper time, of thoroughly up-to-date practice, and would be able to watch results and collect information which could be applied

with advantage to future cases. It would not only act as a useful brake on the possibly excessive enthusiasm of the engineer but its recommendations would carry the necessary weight.

Further, it is suggested that the post-war policy which would be provided by this means would be rendered still more useful if the advisory body were to get to work immediately with a view to arriving at recommendations which, if approved, would enable plans and specifications to be prepared ready for use at the end of the war. Arrangements could be made, if it then appeared desirable, so that the plant could be manufactured either in the works of suitable contractors who have, generally, been engaged on munition work, or in some new Government munition works, thus helping to provide the cushioning effect which is likely to be required during the readjustment to normal conditions.

Even if it should not prove possible or advantageous to utilise the resources of the munition factories, the author hopes that it will be conceded that no effort should be spared to proceed with investigations with the view to ensuring so far as the Post Office is concerned, at the earliest possible date the more efficient equipment on which post-war supremacy will so largely depend.

The author desires to acknowledge the assistance which he has received in the preparation of the descriptive portion of this paper from Messrs. W. H. Powell, H. V. Cornish, J. R. Matthews and E. H. Walters, and also the fact that it is only due to the active support and capabilities of these gentlemen and their assistants that the progress which has been made in these directions during the last few years has been possible.

Sir JOHN SNELL said:

I am sure we shall all agree that we have listened to a very instructive and educative paper. I think the author has expressed in a masterly way, in Part I of his paper, some of the problems which this empire will have to face at the termination of the war. I agree entirely with him when he says that “this country cannot afford to neglect even for a short period to equip herself with the most up-to-date machinery to enable her to compete with her rivals.” It was the impoverishment which followed upon the Napoleonic wars which caused the manufacturers to develop industries at a time when the advantages of steam driving had come into play following upon the discoveries of Watt, Newcomen and others, added to the great natural stores of coal and iron with which the country was endowed. At that time England was literally the workshop of the world. After this war, however, I may venture to say that the conditions will be greatly different. There will be the impoverishment following on the present great expenditure on the war, and we still have our coal and iron, but we shall have to compete with our great industrial rival the United States of America, and no doubt our crafty enemy—Germany—will make the fullest use of his organisation also. It is even more necessary therefore that we shall put our house in order, and make it as efficient as possible to endure competition successfully.

It is sometimes overlooked that this country, being the pioneer industrial country, still has large numbers of factories equipped with what are, in the light of modern practice, obsolete plants, whereas Germany and the States rising to their industrial positions at a much later date have begun their establishments with more modern plant and have benefited from our previous experience. The development of electricity also in the last decade, coupled with the great sources of water power, assist these and other industrial competitors.

I must necessarily be brief in my observations this evening as I have to leave early, but what I have just said is certainly applicable to the general industries throughout the country. How does it affect a great Government Department like the Post Office? I take it that the real usefulness of labour-saving appliances is to enable a certain work to be done by less skilled people, thereby freeing the more experienced craftsmen for other productive work.

In the case of the Post Office it may not always be so easy to show that

Gell Telegraphic Appliances Syndicate, Limited.

ON WAR OFFICE, ADMIRALTY, POST OFFICE, CROWN
AGENTS, AND OTHER COLONIAL ADMINISTRATIONS
LISTS OF CONTRACTORS.

SOLE MANUFACTURERS OF THE

GELL KEYBOARD PERFORATOR.

GELL Motor - Driven Transmitter.

GELL Motor - Driven Receiver

for Morse and Cable Wheatstone working.

Also Manufacturers of

**LANDLINE, CABLE AND WIRELESS
TELEGRAPHIC APPARATUS.**

Registered Offices:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Sardinia House, Sardinia Street, Kingsway, W.C.
Telephone: Holborn 6826.

Works:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Pine Grove Works, Tollington Park, London, N.

Telephone: North 1196.

Telegrams: "Gellitas, London."

THE Telephone Rendered Audible under Gunfire

BY THE USE OF

MALLOCK-ARMSTRONG Patent EAR DEFENDERS.

MR. A. MALLOCK, F.R.S., SIR W. G. ARMSTRONG, WHITWORTH & CO. LTD.

SMALL SOUNDS ARE PRESERVED.

WHEN WEARING THE DEFENDER THERE IS:

NO TEMPORARY DEAFNESS. NO LOST TIME,
NO MISUNDERSTANDING.

IT IS WORN IN COMFORT UNDER THE RECEIVER OR GAS HELMET.
CONSTRUCTED ON ACOUSTIC PRINCIPLES.

Supplied to
every Ship in
H.B.M. Navy.



Involves no
inconvenience to
the wearer.

Remove the
Defenders from
the Clips and
place one in
each ear.



In Metal Pocket
Case with
"Safe-find"
Rubber Clips,
as illustrated,

4s.

Per Pair.

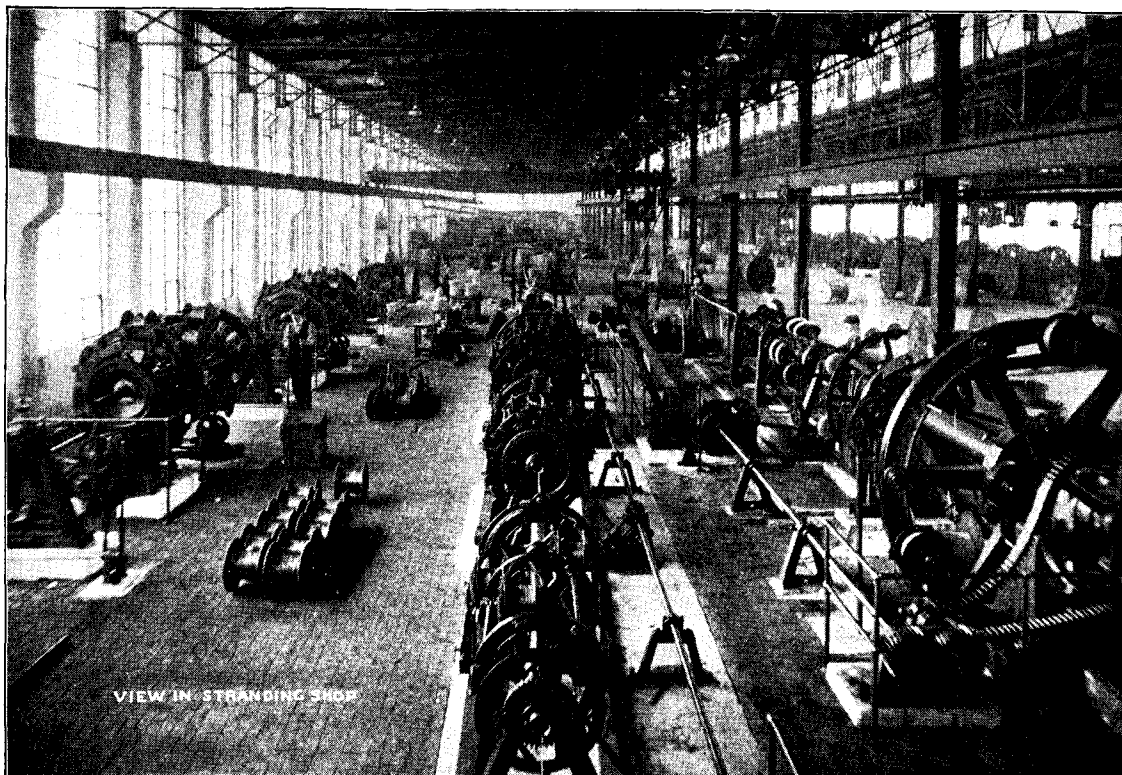
Post Free,
4s. 2d.
with full
particulars.

Many
thousands
already in use
in the
firing line.

Indestructible.

From Stores, Outfitters and Surgical Instrument Makers, or from:

MALLOCK-ARMSTRONG EAR DEFENDER CO.,
FACTORY: 5 CARTARET STREET, WESTMINSTER.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

Safeguard your Health with

Dr. J. Collis Browne's CHLORODYNE

THE RELIABLE FAMILY MEDICINE.

Doctors and the Public in all parts of the world have used it with unvarying success for upwards of 60 years.

THE BEST REMEDY KNOWN FOR
**COUGHS, COLDS,
ASTHMA, BRONCHITIS.**

Acts like a charm
in **DIARRHŒA,
COLIC, and other
complaints of the
bowels.**

Cuts short attacks of SPASMS,
HYSTERIA, PALPITATION.

A true palliative in GOUT,
NEURALGIA, TOOTHACHE,
RHEUMATISM.

Checks and arrests FEVER,
CROUP, AGUE.

NO BETTER PRESENT can be made to a friend on Active Service
at home or abroad than a bottle of this well-known Medicine.

Of all Chemists, 1/3, 3/-, 5/-.

Always ask for a "DR. COLLIS BROWNE."

Silk and Cotton-Covered H.C. Copper Wire,
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
13259 CENTRAL.
"ORMISTON, LONDON."

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.

CIVIL SERVICE Share Purchase and Investment Society, Ltd.

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year. 2 Years. 3 Years. 5 Years. 7 Years. 10 Years.
17s. 5d. 9s. 1d 6s. 3d. 4s. 1d. 3s. 1d. 2s. 5d.

Stocks and Shares bought or sold through the agency of this Society.
Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society
exceeds the sum of £500,000.

The Construction of Underground Conduits

By A. V. ABBOTT.

175 pages. 5 × 8. 58 illustrations.

Price 6/3 net.

Post paid to any part of the World.

This is Volume 2 (complete in itself) of the Author's complete
work on "Telephony," in six Volumes.

CHAPTER I.—The Wire Plant. II.—Duct Materials. III.—Cement
Ducts. IV.—Manholes. V.—Distribution. VI.—Obstacles. VII.—
Cost of Conduits. VIII.—Annual Charges. IX.—Conduit Building.

Standard Telephone Wiring

By J. F. FAIRMAN.

Price 4/2 net.

Telephone Troubles

By E. M. WEY.

Price 2/- net.

Standard Handbook for Electrical

Engineers, Compiled and Edited by Editorial
Staff of the "ELECTRICAL WORLD."

Price 21/- net.

CATALOGUE TT WILL INTEREST YOU.

HILL PUBLISHING CO. LTD.

6 & 8, BOUVERIE STREET, LONDON, E.C.

OPEN AN ACCOUNT AT CRICHTONS'

Known and Recommended
Everywhere.

Let us send you a new Edition
of the Mode Book, 48 pages of
the newest and best fashions,
many original ideas, in

**Furs, Fur Coats,
Costumes,
Overcoats, Macs,
Blouses, Frocks,
Underwear, Shoes,
Trunks, etc., etc.**

All supplied
on our
well-known
'Times' System
from

5/-
MONTHLY
strictly private
and
confidential.

We are the only
actual
Manufacturing
Furriers
dealing direct
with the
profession.

Buy from
the Makers.

Special Terms
to Telephone and
Post Office Staff.

CRICHTONS' LTD.

Manufacturing Furriers and Ladies' Tailors,

14, CRICHTON HOUSE, DEVONSHIRE SQUARE, LONDON, E.C.
(One minute from Liverpool Street Station).

the installation of some appliance is going to save so many pounds sterling annually. But time is literally money, and in our business organisation, which ever becomes more complex and with the ever growing increases in the letters and parcels handled, there must surely be an increasing demand for such appliances as have been described by the author. The diagram which he has exhibited shows graphically and very plainly what saving in time and force can be made.

There is much more that I could have said upon the subject of the paper if time permitted; but before I close I should like to add that the proposal of the author that a small advisory committee should be formed, comprised of representatives of certain of the Departments to whom problems could be remitted and who could think out ahead developments for the good of the Post Office as a whole, is to my mind a very sound and practical suggestion, and one which I have no doubt will commend itself to the high officers of the Department.

CORRESPONDENCE.

PHONOGRAMS.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

HAVING some connexion with the telephoning of telegrams, I read Mr. B. R. Mead's paper on "Phonograms," in the February issue of your journal, with much interest.

It is not often that the "Provinces feel themselves in advance of London, but in the disposal of phonogram traffic by a telephone staff they are undoubtedly so, having been dealing with the work on that side for so much longer a period, that a "Provincial" may fairly claim to speak with some experience of it. In the Liverpool Head Office (to which, as an Assistant Supervisor, Telephones, I belong), the telephone staff have been dealing with this work since 1899. Until recently we have had a telegraph man in charge of our exchange (trunks and phonograms), to whom, of course, knotty points could be referred, but the actual supervision of "Phonograms" has been done by an Assistant Supervisor, Telephones, whose telegraphic education has been principally acquired in painful half-hours with the rule-book, incident on the receipt of those neatly-printed buff forms from London numbered A.G.D. 364.

Mr. J. Bailey (C.T.O.), in his comments on Mr. Mead's paper, appeared to augur gloomy results from a telephone handling of phonograms, but ours have gone up by leaps and bounds, a daily total of 3,100 transactions having been reached quite normally on a recent date. Mr. Bailey said he had visited the more important provincial exchanges, and that the supervision was of so wastefully extravagant a description that it resembled "a cat for every mouse."

He may have been referring to towns in the vicinity of London; I cannot believe that he included Liverpool and other offices of that class in his description, for our phonogram supervision is not infrequently in the ratio of twenty telephonists to one assistant supervisor, which seems quite a fair proportion, and allows as much liberty as any self-respecting "mouse" would wish. The work does not appear to have suffered in its transfer to our department; we even hear an occasional rumour that Headquarters are not displeased with the way in which it is disposed of, so that if Mr. Mead's statistics are not considered justified by his present results, there seems every probability of the best being attained when the telephone staff have had the work in hand for a sufficient period to become thoroughly acquainted with it, our experience proving that a telephonist, understanding thoroughly the conditions in which she is working, is able to grapple more readily with difficulties incidental to that service (disconnexions, faint speech, &c.), than her telegraph sister, whose knowledge is confined to the one side.

One point in Mr. Mead's paper I should like to refer to in closing. He said he should prefer someone "other than the receiving telephonist" counting and pricing the messages. I presume his idea was to relieve this telephonist of any other duty than the actual writing down of the telegram, thus enabling her to deal more speedily with succeeding calls. This would, of course, be the case; but it would prevent any checking of the number of words with the sender, or of the ascertaining that the destination given met the requirements of the P.O. Guide. We find a considerable number of cases arising where speech is necessary with the subscriber on the latter point, and, where sub-offices are concerned, more frequently than not, there is a discrepancy between the number of words stated to be in the message and those are actually received. If these telegrams had to be detained at a later point, the delay on them would be much heavier than the few seconds which is required to do so in the first instance, so, although speedy clearing is a consummation devoutly desired by the harassed phonogram supervisor, whose staff is inadequate to deal promptly with all the demands on their attention, she yet feels it the lesser of two evils to have the form thoroughly in order when it leaves the handing-in position.

EDITH M. MATHEWS,
(Assistant Supervisor, Trunks).

Liverpool.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

I OPENED the February issue of the TELEGRAPH AND TELEPHONE JOURNAL at random, and my eyes fell on the article "Phonograms."

I should like to say first of all that I know nothing whatever of telegraph

working, but, like Alice in Wonderland, I pinched myself to see whether I was really awake when I read the criticisms.

Mr. J. Bailey says "the statements were presented without regard to actual working conditions." Then later he says, "I have visited the most important provincial exchanges and it seemed to me," &c.

Surely this is most remarkable reading. I have always understood that to "have visited an exchange" or exchanges was not considered sufficient experience to give a reliable idea of the "actual working conditions." And the summary fashion in which the whole question of supervision in the Telephone Service is dealt with—six printed lines—is as striking as it is unreal.

Then just for a moment I tried to conceive what would happen should the Department consider the suggestion of using supervisors as operators and dismissing the operating staff. It seemed that exchange managers or other officials would have to act as supervisors, and, in that case, I offer the suggestion that Mr. Bailey would have to change his simile and call it "doggy" supervision.

M. B. PYNE.

Purley Exchange, Feb. 3.

THE TRANSMISSION OF TELEGRAMS BY TELEPHONE.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

THE Editor certainly touched the heart of the matter when he expressed the opinion that Mr. Still's article under the above heading would not meet with unqualified approval. Perhaps the views of a telegraphist who has had considerable experience in telephoning telegrams may be of interest to the readers of the TELEGRAPH AND TELEPHONE JOURNAL.

The principal aims of a telegraph service should be promptitude and accuracy, and, although it is far from perfect, telegraphic transmission comes immeasurably nearer to these ideals than the telephone. The liability to phonic errors is reduced to a minimum when friends, or business men, converse on subjects with which they are familiar—and this is the true use of the telephone—but the dictation of matter, of which the receiver is entirely ignorant, increases that liability to an extent which can only be appreciated by those who have experienced the trying ordeal.

Mr. Still says truly that "we are busy cutting away all our minor telegraph circuits." That is so, and where direct telephonic communication is substituted for direct telegraphic communication, the practice has the advantage of reducing the number of skilled telegraphists required, without any marked increase of delay to the telegrams, beyond that caused by sending them by tube from one part of an office to another; but, where the change involves the use of junctions and through switching at two or three local exchanges, the delay is often serious during the busy hours of the day. The use of the trunks for the transmission of telegrams to several offices, during the slack hours of the day, has recently been introduced at the writer's office and, whatever the theory may be, the practical result has been greatly increased delay. On several occasions the messages diverted to the trunks have been returned to the instrument room for disposal by telegraph.

The hope that our engineers will ultimately provide us with an "infallible" superposed circuit is shared by all, but most users of the telephone are hoping first for an infallible telephone loop. When both these hopes have been realised, it may not be impertinent to ask why the superposed "channels" should not be used to form telegraph circuits, and thus save the Department the extremely difficult task of providing telegraphists for the busy hours, and "merging" them afterwards.

Mr. Still is surely not unbiassed when he sums up the well-known virtues of a telegraph circuit, and then asks the question: "How are we to overcome this in favour of the telephone?" He has set a difficult problem, and his first solution of it, by the provision of a perfect superposed circuit, will probably be realised before the Department adopts his alternative of a hybrid metallic loop in the place of a single telegraph line.

F. W.

INDUCED ELECTRIC CURRENTS.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

IN your January issue an extract is quoted from a proposed letter to a subscriber advising him that certain work is required "in order to prevent risk to the Post Office servants and plant through induced electric currents," and the comment is made "Truly a little knowledge is a dangerous thing—though 'an induced current' may not be."

Now an induced current in the particular case in question might not in any combination of circumstances be dangerous—but as it may be inferred from your remark that induced currents from power circuits are never dangerous it would be well at least to qualify such a generalisation.

In *Telephony*, Dec. 5, 1908, reference is made to a paper by Prof. Morgan Brooks, of the Illinois State University, on "Some Telephone Problems," and in the discussion which followed the professor stated that "he considered it possible under favourable conditions to get a fatal shock by induction from a high tension line 100 feet distance."

It must be borne in mind, however, that the conditions in America are not comparable with those obtaining in this country. In America overhead power transmission circuits are employed working with pressures of over 100,000 volts, whilst 60,000 volt lines are fairly common. In this country 20,000 volts is the maximum with 10,000 volts or thereabouts as the usual pressure on the extra high tension lines.

However that may be—it is a fact that even with these latter comparatively low voltage power circuit, rubber gloves and insulating mats are employed by the officials of the power companies when speaking on the control telephones which run on the same poles as the power wires. These precautions are not taken in view of possible contacts between the power wires and telephone wires—but because static charges are induced which make the telephone circuit not only uncomfortable but dangerous to touch. In addition to these precautions the wires are also earth connected through balanced coils to take off the induced charges. In America these coils are described as “bleeding coils.” I have spoken on some of these circuits and—although it may have been fancy—my moustache certainly seemed to stand out, and appeared to want to leave my face. I should add that although wearing rubber gloves at the time, I was not standing on a rubber mat.

In a paper by Mr. A. W. Martin on the “Co-existence of Lines with Strong Current and with Weak Current,” read at the International Conference of Telegraph and Telephone Engineers held in Paris in 1911, reference is made to tests on a wire running adjacent to the Midland Railway Co.’s single phase electric traction system between Lancaster and Heysham, which showed that the wire was charged to 330 volts (virtual) and that it was unsafe to handle. I know that Mr. Martin had a nasty wound on his hand through accidentally touching the wire, and it was stated by the railway officials that on one occasion after dry weather the wire had fallen, and had set the grass on fire! In this case the separating distance between the power wire and the insulated telegraph wire was about 15 feet and the length of the circuit about 2½ miles. It is possible to reduce this static charge to an inconsiderable amount, however, by placing an earthed wire between the power circuit and the telegraph wire, and this has been done for the protection of the telegraph and telephone circuits on the railway adjacent to the track.

I should like to make clear that this letter is simply written to correct any wrong assumptions that may be made from your comment, and that it is not intended to imply that dangerous conditions exist or are likely to arise in this country. The possibility of dangerous currents or charges being induced in telephone circuits depends upon a number of things which cannot be gone into briefly, but *inter alia* the principal considerations are distance between the power wires and the telephone circuit, and voltage, method of supply and frequency of the power system. As the separating distance between the two sets of plant is a factor over which the Department has control it can be taken that there is practically no danger in this country of Post Office circuits being dangerously affected.

S. C. B.

Engineer-in-Chief's Office
January, 1916.

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

Transfers—

Miss M. CARTER, of London Wall Exchange (Assistant Supervisor, Class II), has been transferred to East.

Miss D. A. KENNEDY (Assistant Supervisor, Class II), from East Exchange, has been transferred to London Wall.

Miss TABITHA E. YOUNG (Assistant Supervisor, Class II) has been transferred from Holborn to Central Exchange.

Miss E. A. WHYTHE (Assistant Supervisor, Class II) has been transferred from Park Exchange to Putney.

Resignations—

Miss G. E. WOODWARD (Assistant Supervisor, Class II), of the Putney Exchange, has resigned in view of her approaching marriage, and was presented by the staff with a cake basket and other useful gifts.

Miss F. B. LARRANCE, of London Wall Exchange, has resigned.

Miss H. HOLLINGSWORTH (Assistant Supervisor, Class II), of Paddington Exchange, has resigned to be married and was presented with a silver cake basket and other useful gifts.

Miss F. E. BAKER (Assistant Supervisor, Class II), of Holborn Exchange, has resigned on account of her approaching marriage, and was presented by her colleagues with a silver cruet, jam dish and other gifts.

Miss G. D. ASKEY, of London Wall Exchange, has resigned.

Miss E. MATTHEWS, of London Wall Exchange, has resigned.

Miss G. BROADHURST, of London Wall, has resigned.

Miss TERESA LYONS, of London Wall, has resigned on account of her approaching marriage, and was presented with several gifts including a dinner service from the staff.

Miss CONSTANCE M. BIZZELL has resigned, and was presented with a gold bangle by her colleagues at Hampstead Exchange.

Miss AGNES B. ABBOTT, of Hampstead Exchange, has resigned, and was presented with ebony backed brushes and mirror.

Miss ALICE M. F. BELL, of Hampstead Exchange, has resigned.

Miss E. E. CHRISTMAS (Avenue) has resigned.

Miss E. ALLEN (Avenue) has resigned.

Miss G. MANSELL (Avenue) has resigned.

Miss M. C. BASTIN (Avenue) has resigned.

Miss F. VON KORMOCZY (Avenue) has resigned to be married.

Miss E. STILL (Avenue) has resigned to be married.

Miss A. G. WOOD, of Mayfair Exchange, has resigned on account of her approaching marriage, and was presented by her colleagues with cutlery and other useful gifts.

Miss C. A. FRENCH, of Paddington Exchange, has resigned in view of her approaching marriage, and was presented with a tea service.

Miss M. M. FENWICK, of Paddington Exchange, was presented with a silver purse on resigning.

Miss OLIVE WAKEFIELD, of the North Exchange, has resigned on account of her approaching marriage, and was the recipient of several useful gifts including a silver cake basket and tea pot.

Miss E. C. WEBSDALE, of Chingford Exchange, has resigned to be married.

Miss FLORENCE M. MILNE was presented with a salver by her colleagues at East Exchange, on leaving to be married.

Miss D. J. MUSSON (East) has resigned.

Miss D. M. BOND (East) has resigned.

Miss G. W. CONNOR (Stratford) has resigned.

Miss M. E. BRADDICK, of Hop Exchange, has resigned on account of her approaching marriage, and was presented by her colleagues with a dinner service and also with several other gifts from personal friends.

Miss M. O. GRAHAM, of Hop Exchange, has resigned, and was presented with a hand bag.

Miss EVELYN M. JONES, of the Trunk Exchange, has resigned and was presented with a tea service.

Miss FRANCIS BLAKE (Trunk Exchange) has resigned.

Miss DOROTHY FARBRIDGE (Trunk Exchange) has resigned.

Miss ERMINA HARRISON (Trunk Exchange) has resigned.

Miss RUBY OWERS (Trunk Exchange) has resigned.

Miss B. L. JORDAN, of New Cross, has resigned in view of her approaching marriage, and was presented by her colleagues with a dinner service and several other useful gifts.

Miss R. V. ELLIOTT, of Lee Green Exchange, has resigned.

Miss E. A. BANKS, of Woolwich Exchange, has resigned.

Miss J. INGLETON, of Bromley, has resigned and gone to Canada. She was presented by the staff with several gifts including a gold wristlet watch.

Miss R. E. HARRISON, of Erith Exchange, has resigned in view of her approaching marriage, and was presented by her colleagues with an elder down quilt and other useful gifts.

Miss IRENE HEAD, of the Female Superintendent's Office, resigned to be married, and was presented with a tea service by the office staff and a breakfast service by the staff of the Central Exchange, also other gifts from personal friends in the service.

Miss FLORENCE VYSE, of the Female Superintendent's Office, has resigned. She was the recipient of several gifts from various friends, and the office staff gave her a silver button hook and shoe horn.

PROVINCIAL STAFF.

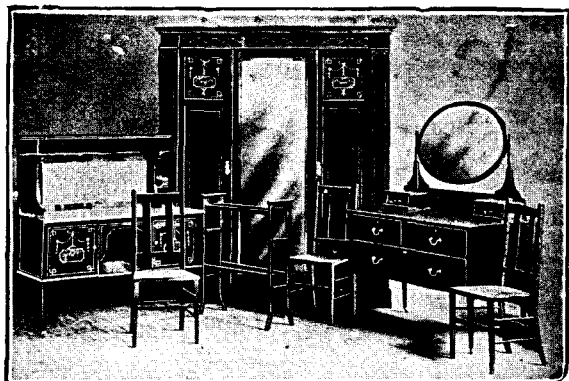
Mr. JOSEPH PARKER, Chief Engineering Inspector, Birkenhead, retired on Jan. 16. Mr. Parker served in the Afghan campaign 1878-1880, and after leaving the Army entered the Lancashire and Cheshire Telephone Company, rising to be Foreman, Inspector and Chief Inspector, and at the time of the transfer of the National Telephone Company to the State was a Divisional Engineer. He was a man of exceptional resource and a thoroughly practical engineer. A large gathering of friends and colleagues assembled in Liverpool on Jan. 22 to bid Mr. Parker farewell.

Miss D. E. BOOT, Telephonist, Nottingham, has been promoted to be Assistant Supervisor, Class II, at Nottingham Trunk Exchange.

Miss F. LE DONG, Telephonist, Swansea Central Local Exchange, has been transferred to the London Central Exchange, and was presented with a travelling trunk by the staffs of the Docks and Central Exchanges as a token of their good wishes.

OBITUARY.

We regret to record the death of Mr. CHARLES FREDERICK SPEARS at Blackburn on Jan. 31, from influenza and pneumonia. Mr. Spears began his telephonic career as a Clerk in the Birmingham District Office, subsequently joining the clerical force at Wolverhampton and ultimately attaining to the Chief Clerkship at the latter place. From this town he was transferred to control the clerical work at Coventry, whence he migrated to the Contract Department at Birmingham. In 1909 he was made Contract Manager at Wolverhampton, receiving a similar appointment at Chester on Sept. 27, 1912. Here he remained three years, succeeding Mr. A. S. Brodie as Contract Manager of the amalgamated Blackburn and Bolton districts on Aug. 22, 1915. Mr. Spears in the short time he was in Blackburn gained the respect of the staff and of the public by his thoroughness. The funeral took place at Birmingham on Feb. 4, wreaths being sent by the Chester and Blackburn staffs.



Antique and Modern Furniture

of Distinction and Durability
can be obtained by

CIVIL SERVANTS

on the most advantageous terms
for

CASH or EXTENDED PAYMENTS

from the

Civil Service Mutual Furnishing Association

LIMITED,

15, CHARTERHOUSE STREET, HOLBORN CIRCUS,
LONDON, E.C.

Established 1877.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital).

Telephone: 1309 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

**Ophthalmic Opticians by Appointment to
Hospitals, Doctors, Public Institutions, &c.**

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund; Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

*The Glasses we supply to Hospital Patients are the best modern
Science can produce, and in no case exceed 3/6, in Steel Frames.*

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3s. 6d. NO EXTRAS.

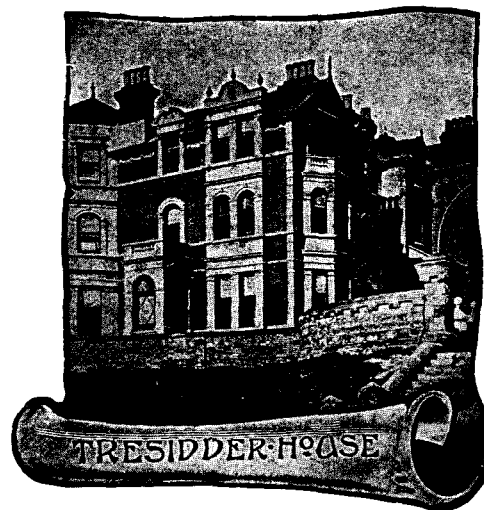
SPECIAL TARIFF TO CIVIL SERVANTS.

Spectacles or Pince-nez in steel or solid nickel frames, with sphere	PER PAIR	s.	d.
or compound Lenses		3	6
Spectacles or Pince-nez with sphere or compound lenses in 10-year			
gold-filled frames		7	6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE,
WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND
ADVISE YOU, FREE OF CHARGE.

HASTINGS

A SPRING RESORT.



HOLIDAY HOME for LADIES

For Particulars and Terms apply to the Hon. Sec.:

Mr. THOS. HUME,

The Sunday School Union,

56, Old Bailey, London, E.C.

BOOKS ON TELEGRAPHY AND TELEPHONY

- AUTOMATIC TELEPHONY.** A clear description of the Strowger Automatic Telephone System as adopted by the G.P.O. By S. TURNER, E.-in-C.'s Office. 32 pp., illustrated. 7d. net, post free.
- TELEPHONE TROUBLES, AND HOW TO FIND THEM.** On both the Magneto and C.B. Systems. Sixteenth Edition. 7d. net, post free.
- HANDBOOK FOR WIRELESS & INLAND TELEGRAPH OPERATORS.** By CHARLES WARD. A useful and practical work. 1s. 1d. net, post free.
- THE HANDY ELECTRICAL DICTIONARY.** By W. L. WEBER, M.E. Contains definitions of over 4,800 distinct words, terms and phrases. 1s. 1d. post free.
- THE TELEGRAPHISTS' AND TELEPHONISTS' NOTE BOOK.** Third Edition. Handy pocket size, $5\frac{1}{2} \times 3\frac{1}{2}$ inches, with squared pages for Memoranda, Calculations, &c. Highly spoken of by leading P.O. officials. Price 1s. 6d. net, or 1s. 7d. post free.
- QUESTIONS & SOLUTIONS IN MAGNETISM & ELECTRICITY.** By W. J. WHITE, M.I.E.E. Containing solutions to all questions in magnetism and electricity set by the Board of Education and the C. and G. Inst., for the years 1907-1913. Crown 8vo. Fully illustrated. Price 1s. 8d. net, post free.
- THE HUGHES AND BAUDOT TELEGRAPHS.** By ARTHUR CROUCH. Invaluable to students, as a knowledge of both systems is now demanded by the examiners. Cloth 8vo. 1s. 6d. net, 1s. 8d. post free.
- QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY, Final Examinations, 1906-1915.** By H. P. FEW, Silver Medallist, &c. Limp Cloth, 8vo., illustrated, 1s. 6d. net, 1s. 9d. post free.
- TECHNICAL TELEGRAPHY.** By ROBERTS and BURROWS. Fifth Edition. Contains "Hints to Students," together with an exhaustive selection of questions and model answers in all grades of the C. and G.T. and T. exams. Completely revised. 1912-13 exams. included. 2s. net, 2s. 2d. post free.
- THE TELEGRAPHISTS' GUIDE.** By BELL and WILSON. Absolutely the best and most up-to-date work of its kind on the market. For class teachers and students alike it is invaluable, and the repeated calls for fresh editions prove its merit. Sixteenth thousand. 2s. net, or 2s. 3d. post free.
- NOTES ON TELEGRAPHY.** By G. MOGG. A simple exposition of the rudiments of technical telegraphy and telephony. Specially designed to meet the requirements of the C. and G. ordinary examinations. 2s. 6d. net, 2s. 9d. post free.
- QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY.** By H. P. FEW. Includes model solutions to the C. and G. exams. 1904-1914, as well as to several typical questions set at the Post Office Departmental exams. for Overseerships. Fourth edition. Cloth. 230 pages, 172 illustrations. 2s. 6d. net, or 2s. 9d. post free.
- GUIDE TO THE PRACTICAL ELEMENTS OF ELECTRICAL TESTING.** By J. WARREN. A useful work, clearly expressed and well illustrated. 3s. 6d. post free.
- PRACTICAL TELEPHONY.** By JAS. BELL, A.I.E.E., and S. WILSON, A.M.I.E.E. A simple and practical handbook suitable for students, artisans, &c. Copiously illustrated. Latest edition. Twelfth thousand. 3s. 6d. net, 3s. 9d. post free.
- MANUAL OF WIRELESS TELEGRAPHY.** By Comdr. S. S. ROBISON, U.S.N. The standard text-book for Marconi students. Recommended by the editor of the P.O.E.E. Journal, The Electrical Review, and by all the leading teachers. Latest edition. Cloth, 8vo. 241 pp., illustrated. 8s. net, 8s. 4d. post free.
- PRACTICAL TELEGRAPHY.** By H. W. JENVEY, M.I.E.E., Electrical Engineer to the Postal Department, Victoria. A standard text-book specially suitable for Colonial telegraphists. Fourth edition, revised and enlarged. Cloth, 8vo. 444 pp. and 83 illustrations. 10s. 6d. net, 10s. 9d. post free.
- TELEPHONY.** By SAM'L G. McMEEN and KEMPSTER B. MILLER, M.E. The latest and best book published on the Theory and Practice of all phases of Telephone Work. 960 pp., 700 illustrations. 17s. net.
- STANDARD TELEPHONE CONSTRUCTION METHODS.** By FRANK B. HALL. This book contains 250 full-page drawings of standard materials and methods of construction; 280 pages of specifications and tables. No detail from sub-station to main distributing frame omitted. Price 17s. net, post free.

Sent post free at prices stated by

S. RENTELL & CO. Ltd., 36, Maiden Lane, Strand, London.

WRITE FOR CATALOGUE NO. 36.

Take Hold of Success

More chances are opening up to-day for better-than-average men and women than ever before.

Don't be left behind.

Stop right here and think--don't mar your future by hesitation and timidity--develop your mental efficiency on practical lines--train your mind to achieve--to grip every chance and make the most of it.

Arnold Bennett says mental efficiency is essential to success.

This series of mental efficiency books, edited by a business expert who has helped thousands to success, has just been printed, and to first buyers we offer to send them on approval at our risk. They are marvellous books, unfolding the secrets of business success, rapid progress and certain fortune. Apply quickly for an approval set; only a certain number available.

MENTAL EFFICIENCY SERIES.

Poise: How to Attain It. By D. STARKE.

Force of Character: How to Develop It. By D. STARKE.

Timidity: How to Overcome It. By YORITOMO-TASHI.

Influence: How to Exert it. By YORITOMO-TASHI.

Opportunities: How to Make the Most of Them. By L. CHARLEY.

Common Sense: How to Exercise It. By YORITOMO-TASHI.

Practicality: How to Acquire It. By R. NICOLLE.

Perseverance: How to Develop It. By H. BESSER.

Speech: How to Use It Effectively in All Phases of Daily Life. By XANTHES.

Personality: How to Build It. By H. LAURENT.

Any single volume can be supplied for 3/-; 3/4 by post.

Exclusive Terms to readers of the T. T. J.

By using the Coupon below you can have the entire set to examine for Three clear days, at our risk. You can then either return them or keep the set and send

2/6 only,

the rest being payable by monthly instalments.

YOU RUN NO RISK.

WAR WORDS and their meaning.

Enclose two Penny Stamps for a copy of this valuable book. Ask for complete catalogue, which will be sent post free.

Coupon for Free Inspection.

To Messrs. FUNK & WAGNALLS,
134, Salisbury Square, London, E.C.

Please send me on approval for three days, carriage paid and entirely at your own risk, a set of the MENTAL EFFICIENCY BOOKS. If approved, I will send 2/6 within 8 days and 2/6 per month thereafter till the full purchase price of 30/- is paid. If I do not want the books after inspection I will return within three days of receipt.

Name.....

T.T.J. Address.....

THE Telegraph and Telephone Journal.

VOL. II.

APRIL, 1916.

No. 19.

CONTENTS.

	PAGE		PAGE
PHONOGRAMS AND TELEPHONE-TELEGRAMS. By JOHN R. BATCHELOR	137	HIC ET UBIQUE	149
THE PHANTOM TRUNK. By E. J. SITHENS	141	THE BATTLE OF THE BAWBEES AT DUNDEE	149
TERRESTRIAL MAGNETISM. By ARTHUR E. COTTERELL	143	THE LOADING OF TELEPHONE CIRCUITS. By A. B. HART	150
"ARDENTIA VERBA." By H. BRISTOW	145	OUR MONTHLY RECORD OF NAVAL AND MILITARY HONOURS	153
TELEGRAPHIC MEMORABILIA	146	WAR—THE TELEPHONE AND THE TELEPHONISTS. By A. E. CARPENTER	154
THE GERMAN ARMY AND ITS TELEPHONES	147	ZEPPELIN RAID WARNINGS	155
EDITORIALS—		LONDON TELEPHONE SERVICE NOTES	155
THE NEW UNDERGROUND TELEPHONE CABLE BETWEEN LONDON		CORRESPONDENCE	156
AND LIVERPOOL	148	PERSONALIA	157
THE TELEPHONE AND THE CINEMATOGRAPH	148		
ZEPPELIN RAID WARNINGS	149		

Subscription: To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies: To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

PHONOGRAMS AND TELEPHONE-TELEGRAMS.

The system of intercommunication for phonograms and telephone-telegrams as regards telegraph collecting centres and telegraph zone centres, combined with high-speed telegraphy and the introduction of a cheaper tariff of deferred telegram.

By JOHN R. BATCHELOR (*Assistant Traffic Superintendent, Leeds*).

THE remarkable development in the art and practice of telegraphy and telephony which has taken place during recent years, and more especially the interdependence of these two important sections of the Service, since the war began, have necessitated the adoption of new methods of dealing with the telegraph traffic. Speaking of one phase of our personal experiences in the development of traffic necessities of to-day, it can be said that we have learned that the utility of the telephone with regard to phonograms and telephone-telegrams is indispensable to traffic development and present conditions. A separate phonogram room, where quietness is a most valuable asset, is the ideal condition under which such traffic may be performed.

It has been found that such rooms are not often available and phonogram positions have consequently been erected in trunk exchanges and instrument rooms—most frequently in the latter. At the outset, the volume of noise inseparable from a busy trunk exchange, and more so in an instrument room, tended to interfere to a certain extent with the satisfactory transmission of phonograms and telephone-telegrams, but the introduction of suitable apparatus and the adaptability of the phonogram operators to the work, have overcome this difficulty very appreciably.

With the removal of exchanges to Post Office premises, wherever such a course was possible, or at least the establishment of telephonic communication between the local exchange and Post Office in every small or large town and city, an opportunity was afforded of utilising, for telegram purposes, that vast system of telephone lines and junctions which link together our industrial centres. Practically all head and sub-Post Offices are now linked up with the telephone system. In some cases where the traffic is heavy, telegrams are transmitted by telephone from the sub to the head Post Office, whilst in others the circuits are used jointly, i.e., both for telephone and telephone-telegram purposes.

This transition in the despatch of telegrams from the more skilful manipulation of telegraphy to the simplicity of telephone methods, forms an interesting psychological study. It means the upheaval and overthrow of many dogmatic principles respecting telegraphy in regard to short-distance traffic and the furtherance on sound lines of the adaptability of an excellent and universal system of high-speed telegraphy between telegraph zone centres for the disposal of long-distance traffic. The unification of the two Services carries with it advantages that are especially patent in the present national crisis.

To us in the British Isles this may seem too quick an inversion of the natural order of affairs. But it is not. Our minds are keenly intention, and our best interests involved in, the war.

At this moment when the nation is confronted with the gravest crisis in its history, we are apt to forget that no fewer than 50,000 members of the Post Office staff are wearing khaki, and the number increases daily. The efficient working of the telegraphs has been met by the introduction of telephone-telegram operating on a large scale. How far has the process justified its introduction? It has been argued with some show of reason, that the new system is much slower than that of ordinary telegraphy, yet very few instances in traffic returns of delay have proved such to be a valid conclusion. Rather must they be isolated cases where the thorns of inexperience as usual bestrew the paths of new ideas. Besides, the time gained by through switching on the telephone line compared with the longer process of receiving and sending the telegram at every telegraphic transmission, seems to have been overlooked in the argument. Why should this system of operating become universal? Because it is the method best adapted to the present and future needs of the Service. It indicates progress; progress in the proper direction. But progress is ever revolutionary, though not always unduly disturbing! Thus a gradual transition from one method of operating to another that is more simple and fits more economically with the idle periods of the telephone traffic will result in an advantage permanently.

In London nearly 200 telegraph circuits were transformed to the telephone-telegram method, and the change was so successful as to be practically unnoticed in effect by the public. A corresponding change was made throughout the country with excellent results, so "perhaps the voice of controversy" displayed by the opponents of any new system

"may be hushed in a general eclecticism," and help to promote the best interests of the new method irrespective of reaching a sudden and unfair decision before the system has been given a fair trial. It calls for patience and for practice; for patience in that the slow process of perfecting the system is needed for sound investigation, for practice in that theoretical considerations have often proved to be misleading in the study of traffic problems. Once established, the telephone-telegram system will thenceforward be perfected and proved to be successful, and should be adopted for all time. Much has already been done towards securing greater efficiency. The cause of this astonishing success, which in such a brief space bids fair to raise a new method to the almost complete mastery of the existing difficulties caused by the depletion of telegraphists owing to the war, can only be partially discerned from the evidence at my disposal. The decisive factor has undoubtedly been the simplicity of the method of working and the evident adaptability of the new process in preference to that of ordinary telegraphy to suit the present staffing conditions.

Little imagination is required to see that the postal and outer areas of each of our large cities are crowded with a vast network of telephone lines intersecting one another in bewildering fashion and forming excellent means of communication for telegraph and telephone traffic, by which direct communication and intercommunication are always available. Indeed, the criss-crossing in some districts is amazing. Such industrious hives as London, Glasgow, Edinburgh, Manchester, Birmingham, Dublin, Liverpool, Sheffield, Leeds, Belfast, &c., are cases in point.

To quote one instance, it may surprise many to know that if Leeds were the centre of a circle with a radius of 10 miles, that circle would be found to contain over 8,000 miles of telephone lines, of which 600 miles are cross junctions.

With this vast array of communication lines available, the traffic requirements of the district form a very interesting study. The inner circle, see Fig. 1, would be found to contain such industrial centres as Wakefield, Dewsbury, Stanningley, Morley, Otley, Bradford, Guiseley, Shipley, Low Moor, Cleckheaton, Castleford, Normanton, Heckmondwike, &c.: while a circle of 15 miles radius would also include Huddersfield, Halifax, Ilkley, and many other busy satellites. When we think of these towns and cities linked together by direct or intercommunication lines on which to send telephone-telegrams, it can be estimated how suitable the methods of intercommunication and through switching of telephone-telegram circuits lend themselves in preference to that of ordinary telegraphy. Moreover, it will be found that similar conditions obtain in the adjoining Manchester, Sheffield, and other zones.

Limited space precludes the inclusion in the diagrams of the town and sub-offices of the towns and cities, but one illustration alone will suffice to show the enormous volume of telegraph traffic available for transmission by the telephone-telegram method. During the year ended 1914 over 800,000 telegrams were dealt with in the Leeds town, branch and sub-offices. The new system requires no elaborate equipment; any telephone will serve the purpose. Telegrams may be transmitted almost equally well from a call office as from a head Post Office. Such lines are led to the local exchange and terminate each on a subscriber's number and indicator at an "A" telephonist's position. Exceptions may, however, arise in those cases where heavy loads warrant the provision of direct junctions to the feeder position in the phonogram or instrument room. The usual busy hour of a local exchange and that of phonogram and telephone-telegram traffic do not coincide. A study of the load-lines and operating statistics of local exchanges shows that the telephone traffic is usually at its peak between the hours of 10 and noon, while the busy periods extend from 9 to noon with a less busy period from 3 to 5. I have noticed a reduction in the traffic of quite 75 per cent. in local exchanges between 12.15 and 2 p.m.

On the other hand, an examination of telegraph traffic shows less variation than appears in the telephone work, so that, during the period of 12.15 to 3, a large proportion of the telephone lines are insufficiently supplied with traffic and should therefore be available for telephone-telegrams. So, without any additional expense in extra equipment, lines are available for the transmission

of those telephone-telegrams which are able to be deferred till 12.15 or later. Hence the differentiation of traffic and the adoption of the bi-functional arrangement of junctions.

After carefully studying the peculiarities of the telephone and telegram traffic and the conditions which govern direct and through switching, the bi-functional method of separate outgoing and incoming junctions between the instrument room and the local exchange has been adopted. It is undoubtedly the best method. The junctions between the Leeds instrument room and the Central Exchange are as follows:—

Twelve outgoing junctions from the instrument room, each terminating on a subscriber's indicator at an "A" telephonist's position in the Central Exchange.

Twelve incoming junctions from the Central Exchange terminating on the "feeder" position in the instrument room, whence by cord and peg connexions they can be joined to adjacent phonogram and telephone-telegram positions.

One both-way junction for "enquiries."

By this method the difficulties incidental to both-way operating are avoided, i.e., when an "A" telephonist takes up a junction which has just been cleared and the phonogram operator is not aware from her signal that a fresh call is being made.

What has been said in connexion with the practice in Leeds of working the telephone-telegram circuits on the bi-functional method, i.e., outgoing and incoming circuits between the instrument room and the Central Exchange, so as to utilise the vast system of junctions beyond the Central Exchange, when the incidence of the phonogram and the telephone traffic do not coincide, may be repeated in respect of other telegraph centres environed by a vast network of telephone circuits linking together the numerous towns of industry that surround large cities and enable such towns by intercommunication to send telephone-telegrams from one to another without the need of through-switching at the telegraph zone centre.

It would almost appear that the most glaring shortcoming of the telephone-telegram method is that it has not already developed far enough conjointly with high-speed telegraphy. The outstanding features of the entire system advocated herein are:—

1.—The segregation of the traffic, and the adoption of the bi-functional arrangement by which there shall be "outgoing" and "incoming" junctions between the phonogram or instrument room and local exchange, thus avoiding the difficulties incidental to both-way working, as already explained.

2.—The elimination of the difficulties experienced when phonogram operators have to call Post Offices or exchanges a second time after being switched through.

3.—The simplification of routing problems.

4.—The avoidance of through switching at a telegraph zone centre when an alternative route equally as good is available.

5.—The amount of through switching, apart from 4, would be reduced to a minimum.

6.—The collection of long-distance traffic would be switched through direct to telegraph zone centre.

7.—The sending and receiving of telegrams on trunk positions when trunk lines and operators would be otherwise idle.

8.—The delivery of telegrams to subscribers by telephone in preference to delivery by telegraph messenger from head or sub-Post Offices.

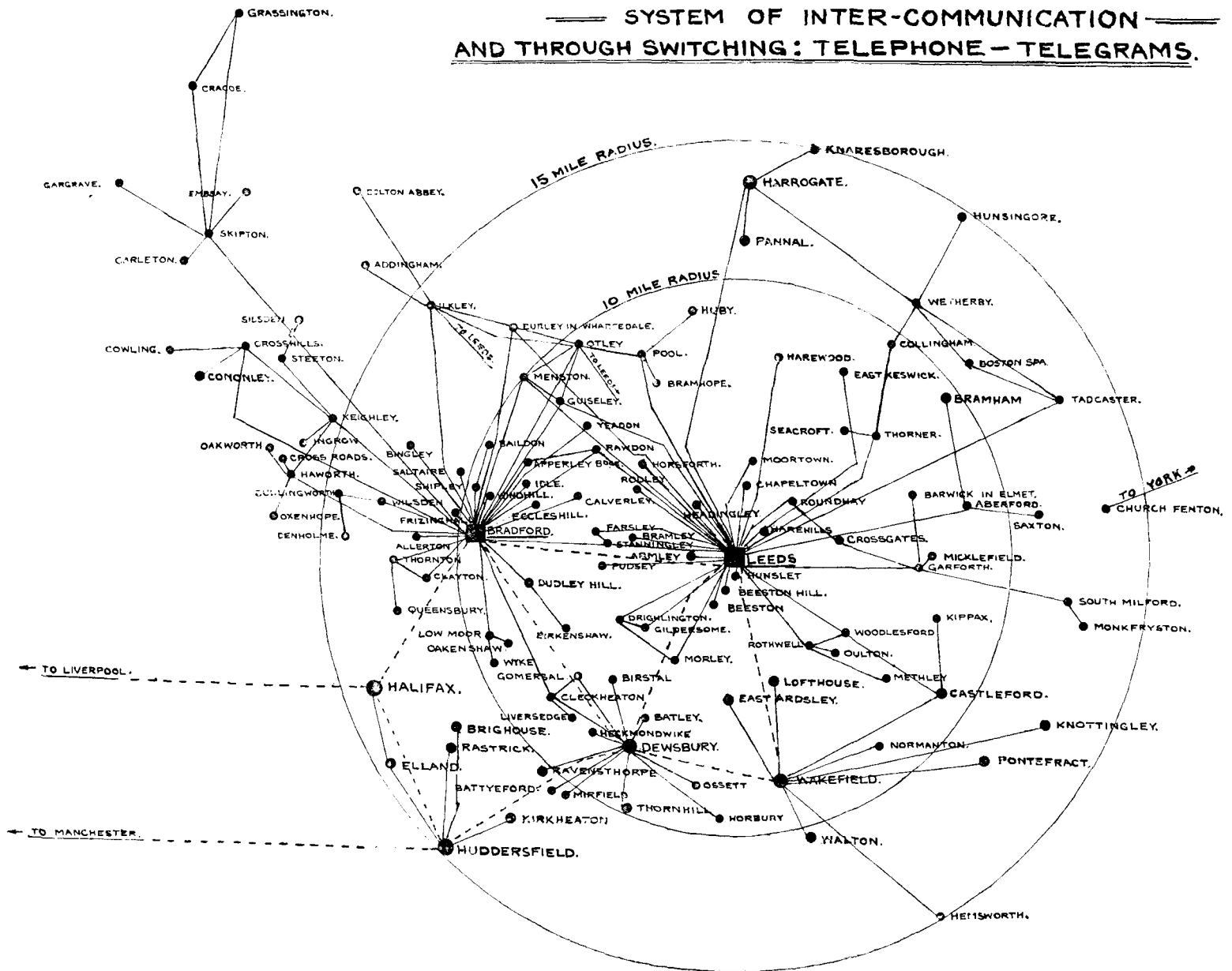
9.—The introduction of a cheap deferred telegram rate.

10.—Classification of work and staff.

The consideration of improved methods, or of suggestions in changes of method, ought to come within the purview of all telegraph and telephone exponents. Facilities for the study of such problems should be accorded *ad lib* to enthusiasts.

The adoption of No. 5 would reduce the difficulty mentioned in No. 2, for it is a definite loss of revenue-earning time (as on a long through-switched trunk line) to be cut off in the middle of a

SYSTEM OF INTER-COMMUNICATION AND THROUGH SWITCHING: TELEPHONE-TELEGRAMS.



transaction and be compelled to call and re-unite the several links comprising the whole line.

The simplification of routing problems bespeaks success. Throughout the British Isles are established zone centres, both of telephone and telegraph. With both, the telephone-telegram method should be incorporated; not literally, but to an extent which traffic requirements dictate. For instance, Fig. 1, demonstrates methods which are capable of being applied equally as well at any other city or seat of industry. Quite a nucleus of important towns and cities surround Leeds and Bradford. Taking one instance, Leeds is a telegraph zone centre probably in the near future to be connected by high-speed telegraphy to other telegraph zone centres. Supposing such Post Offices as Dewsbury, Wakefield, &c., had direct junctions terminating on the feeder position in the Leeds instrument room, facilities would thus be provided by which those Post Offices would be able to act as telegraph collecting or switching centres, whence all the smaller towns surrounding them could be switched through direct for telephone-telegram purposes to Leeds. Junctions so suggested are illustrated on the diagram by dotted lines. It will be seen also that other telegraph switching centres such as Huddersfield, would be connected by direct junctions to Manchester phonogram room, and also to one another according to the volume of traffic. Facilities would thus be provided for the

transmission of a telegram by the telephone-telegram method from the smallest town direct to the town of destination by intercommunication method, or to the nearest telegraph zone centre, and thence by high-speed telegraphy.

Take Dewsbury as an example. The total number of telegrams dealt with daily average about 350; of these 200 pass over the Leeds and Manchester telegraph lines, while 150 are even now disposed of by the intercommunication method. By the telephone-telegram method many of the 200 telegrams would have been through-switched direct to the telegraph zone centre and thus have saved transcription and re-sending by telegraph at Dewsbury.

It is clear that the adoption of these methods at Dewsbury would deprive that Post Office entirely of telegraphy. Telegraph lines could be absorbed in telephone developments and the telegraph equipment recovered. Except at a telegraph zone centre, there will scarcely be any need for telegraphy. What is required will be essentially of a high-speed nature. As at Dewsbury, so elsewhere; the telephone-telegram method adapts itself wherever telephony exists.

I also advocate the establishment of combined local and trunk exchanges, wherever possible economically, at Post Offices.

Elocution is an art sadly neglected in all classes of education. It is one that could be profitably persevered in by telephonists.

In no phase of operating is it more essential than on "outgoing" junctions used for the transmission of phonograms and telephone-telegrams. Given a good elocutionist from whom to receive traffic, a typist, placed at an "incoming" position and supplied with a headgear telephone and low-sounding typewriter, could type telephone-telegrams at an excellent pace, without the need of repetition of telegrams beyond the usual telegraphic safeguard of the repetition of figures.

Almost every Saturday eight to ten pages of press matter are transmitted by telephone from Dewsbury to another Post Office without difficulty, error, complaint, or the necessity of repetition.

The new Budget rates came into operation on Nov. 1. In consequence of the policy thus adopted by the Department in traffic rates, a reduction in the volume of traffic was truly anticipated. Prior to November, the average telegram was considered to cost about 8d., so that although twelve words were available for the minimum charge of 6d., sixteen words proved to be the average length of a telegram, despite the fact that the senders of all telegrams generally strove to condense them as much as possible,—*mutum in parvo*. It can be estimated, therefore, that the average telegram will still be of sixteen words in length, costing the sender 11d. With the new rates of twelve words for 9d., the discontinuance of other than important telegrams can readily be anticipated, and such abstinence will result in a vast reduction in the number of telegrams with a corresponding compensation of revenue in the higher rates, but what about those telegrams which are now precluded by reason of the effect of the new charges but would have been sent under the old tariff? The present seems an opportune time for the introduction of a new tariff—a kind of by-product—which would run parallel with the new method of telephone-telegram operating. Let us look at the case broadly and with true business acumen! The Department never guarantees to deliver a telegram within a specified time, but only as soon as possible. There is a vast majority of the senders of telegrams who do not complain of little delay. There are others who would not complain of more delay, and I consider that not a few of the last mentioned will hesitate in face of the new tariff and ultimately not send telegrams, but they would undoubtedly send telegrams, as they did under the old régime, if a lower tariff, combined with no guarantee of quick delivery, was introduced.

There is also another point regarding long and expensive trunk lines. The trunk charges increase according to the length of trunk lines used, or in direct proportion to the outlay of expense in the erection of such lines, i.e., the longer the line used, the higher the trunk charge. It has been found that the lack of capable supervision over the operating of long-distance trunk lines resulted in a definite loss of revenue on those lines. Consequently the old method of leading four trunk lines indiscriminately on to a trunk operator's standard position was discarded, and, since an operator's load should be neither more nor less than a number of calls sufficient to fill the whole of her operating time successfully, the lines were re-arranged so that the trunk operator could obtain most revenue-earning time out of the lines on which she was operating. An excellent method ("the inter-province") was introduced; for instance, on the Belfast to Leeds line, and by special supervision, a higher percentage of revenue-earning time was obtained. There was successful specialisation for quicker service and revenue-earning purposes. Then the zone system was introduced; also successfully. Finally, the "rapid fire" junction system, so well detailed in No. 1 of this journal, has produced a golden harvest in Manchester, Liverpool, Leeds, Bradford &c. districts.

High-speed telegraphy forms a parallel case to these. Every item in such special telegraph instruments, Creed re-perforators, Gens, &c., and long lines, is involved and most expensive, yet the charge for a long-distance telegram remains the same as for a short-distance telegram regardless of speed of delivery. Is this logical? Surely the basis of loading such lines must be in unison with the modern developments or the necessity? It must be material as well as formal. Why not charge on speed of delivery? It would appear that there is an excellent opportunity, especially

in view of the introduction of the telephone-telegram system, of persuading the public to send telegrams at a reduced rate. The old rate of twelve words for 6d., or even for 4d., or 3d., as circumstances warrant, irrespective of delay, would prove successful in every way. Why? We should have two telegrams of different prefixes, one charged at a higher rate for quick delivery, the other at a lower rate for deferred delivery. How would this work in practice? Preference would be given to the quick delivery telegram in the same way as priority is so successfully given nowadays to military telegrams and priority trunk calls. Between all telegraph zone centres, the traffic could be despatched by high-speed telegraphy, whereas the traffic from the collecting centres could be worked on telephone-telegram methods. The slack periods on both systems could be filled by the deferred telegrams paid for at the lower rate. As stated previously, the traffic curve at many local exchanges falls as much as 75 per cent. between the hours of 12.15 and 2 p.m., so sufficient junctions would be available then for the use of all the deferred telegrams awaiting disposal by inter-communication, within-zone working, or by through switching to the telegraph zone centre.

A most interesting description of the excellence of one of the methods of high-speed telegraphy, the "Creed," is ably dealt with in No. 1 of this journal, and shows the remarkable results obtained between Bristol and Jersey during the potato season of 1914.

It is not contended that this dual system of telegraph traffic monopoly is, so early in its inception, without blemish. Any system, however simple or complex, and, in some respects, anomalous, presents points of attack; but the transparent simplicity of the telephone-telegram method renders its defects peculiarly apparent. Its very perfections betray its faults, which experience will soon remove. As the best system of operating, during the present crisis and in the future, its suitability is indisputable.

MESSRS. SIEMENS' STAFF.

An interesting event took place on March 6 at the Woolwich works of Messrs. Siemens Brothers & Co., Limited, the occasion being the completion of 50 years' service in the employment of the company, by Mr. Robert Berram of the Despatching and Receiving Department. Mr. Alexander Siemens presented him with an illuminated address and a cheque from his colleagues at the works, as a token of their esteem and regard, and also a cheque on behalf of the company as a recognition of his faithful service, and the manner in which his duties had always been performed.

We have received from Messrs. Siemens a list of over 1,000 members of their staff serving in H.M. Forces during the Great War, and a Roll of Honour containing the names of over 40 officers and men who have fallen.

EDINBURGH TELEGRAPHISTS' ROLL OF HONOUR.

During his visit to Edinburgh on March 7 Colonel A. M. Ogilvie, C.B., unveiled the Roll of Honour for the telegraph staff which has been fixed in the instrument room. Out of 156 male telegraphists, 78 were now on active service, whilst 34 were employed on special naval and military duties at home stations. Of the 44 remaining, only 6 were eligible, and they were ready to go whenever called upon.

On leaving the Secretary's Office, Colonel Ogilvie, accompanied by a large number of telegraph and telephone officials, including Mr. W. G. C. Kirkwood (Secretary to the Post Office in Scotland), Mr. J. J. Thompson (Chief Clerk), Mr. J. M'G. Thom (Accountant), and Mr. Geo Dawkes (Comptroller of Telegraphs) was met by a pipe, who led the party to the instrument room.

A Guard of Honour, consisting of Royal Engineer telegraphists and messengers, lined the corridors, and afterwards proceeded to the instrument room for the unveiling ceremony.

Colonel Ogilvie, in unveiling the Roll, said he was proud that they had responded most nobly to the country's call. There were at the present moment considerably over 6,000 telegraphists serving in the naval and military forces of the Crown, either abroad or at home, and there were many others only too anxious to get the opportunity to serve. The signal service had been one of the outstanding successes in all parts of the world. It had been admirably conducted. That was due to the splendid skill and to the faithful work which had been done by the Post Office staff. (Applause.) He had had the opportunity on two occasions of going through the signal offices in France, at the base and along the front, and wherever he had gone he found the Scotsmen taking a prominent part, and the Edinburgh men taking the lead. This was only what he expected. (Applause.)

Appropriate votes of thanks having been proposed, the function, throughout which the utmost enthusiasm prevailed, was concluded by the singing of the National Anthem.

SIEMENS AUTOMATIC TELEPHONES



Standard Automatic Wall Telephone.

Features :

1. Instantaneous service
2. Called Station Bell is rung automatically until answered or until calling station hangs up.
3. Absolute secrecy.
4. Easily extended.
5. Simplest wiring,
6. No operating charges.
7. Continuous service.
8. External Extensions with 2 wires only.
9. No Multiple Cable required for any Extensions.

Works: Woolwich.

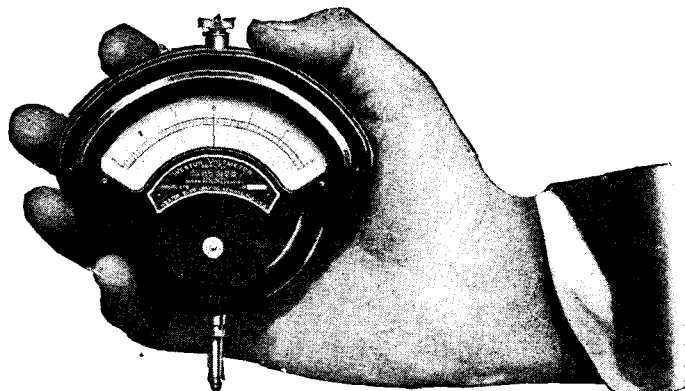
Over 4,000 employees.

Write for Pamphlet T 535.

SIEMENS BROTHERS & CO., LTD., WOOLWICH.

WESTON

Miniature Precision D.C. Instruments



MODEL 279 BATTERY TESTING VOLTMETER.

The instrument is fitted with a Detachable Spike Terminal and Flexible Lead with Spike Terminal.

DELIVERY FROM STOCK.

Weight, 11.6 oz. List Price, 49/-

WRITE FOR LIST D3.

WESTON ELECTRICAL INSTRUMENT CO.

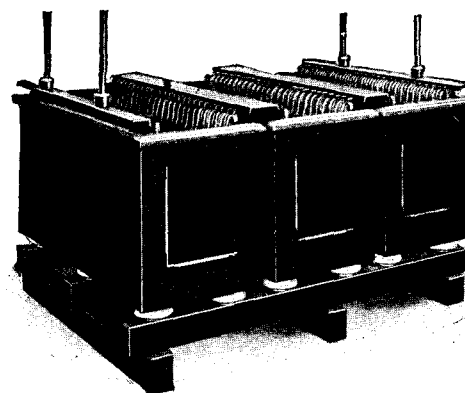
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

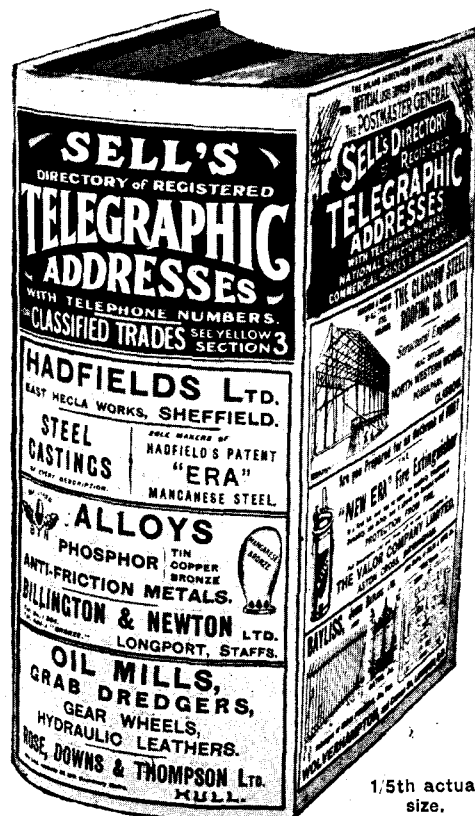
SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

Telephone Numbers

are given in the List of Firms for LONDON AND COUNTRY.



The Inland Abbreviated Addresses are from Official Lists supplied by Authority of the Postmaster-General

SELL'S DIRECTORY OF REGISTERED TELEGRAPHIC ADDRESSES

WITH TELEPHONE NUMBERS.

NATIONAL DIRECTORY OF LARGE COMMERCIAL HOUSES AND BUYERS' GUIDE.

Founded by HENRY SELL.

CONTENTS:

80,000 Names of British Firms with their Telegraphic Addresses and Telephone Numbers.
Complete Index to the Telegraphic Addresses Registered in London and Country.
100,000 Names in Trade Section Classified under 3,000 Trade Headings, and
30,000 Names in the British Empire Overseas and Foreign Countries,
With Full Postal Address, Code, Cable Address, and Trade Description.

Price of Volume 25/-

Including Annual Supplement in July giving particulars of all changes to date of issue.

IMPORTANT IMPROVEMENTS.

The National Directory of Large Commercial Houses and Buyers' Guide which was added to the Volume some years ago, now forms a large and valuable section of 600 pages closely printed, giving 100,000 names and addresses arranged by Trades. Every name in the Volume has been numbered to facilitate and cheapen the cabling of names and addresses the world over. Consular Representatives and Trade Commissioners and Correspondents in British Dominions Overseas, are given, and a list of Telegraph Tariffs from London to all parts of the world, Telegraph Regulations, and Trade Marks and Brands Sections. New "Indicator" words for London Telegraphic Addresses.

Offices: 166, FLEET STREET, LONDON, E.C.

Telegrams: "SELL, FLEET, LONDON."

Cables: "SELL, LONDON."

Telephone: HOLBORN 1693

N.B.—Only those firms who have Registered a Telegraphic Address at the Post Office are inserted in the Official Lists.

ORDER FORM FOR BOOK.

To Mr. SELL, Business Dictionaries, Ltd., 166, FLEET STREET, LONDON, E.C.

Send $\frac{me}{us}$ your Annual Volume of "Registered Telegraphic Addresses" for 1916, carriage paid, for which $\frac{1}{ve}$ agree to pay 25/- net, cash on delivery (charge includes Free Copy of Supplementary Edition published in July).

Name.....

Address.....

Date.....

Extra Strong Full Leather Bindings, 30/- net.

THE GREAT NATIONAL DIRECTORY.

THE PHANTOM TRUNK.

BY E. J. SITHENS (*Philadelphia*).

[Reprinted from the *Telephone News*, Philadelphia, to which we are indebted for the loan of the blocks illustrating the article.]

"PHANTOMS" and "physicals" are common parlance among most plant men, but to many persons in some of the other departments there exists only a vague understanding of what these words stand for in the telephone world.

The following has been written in an effort to give a non-technical description of the circuits to which the terms "phantom" and "physical" apply.

The phantom trunk is a talking circuit between two points (generally central offices) obtained by using the pairs of wires of two ordinary trunk lines, and by the combination getting three complete trunks where ordinarily there were but two. Two ordinary trunk lines when so combined as to form a "phantom" are commonly called "physicals" by plant men.

Referring to Fig. 1, a simple phantom trunk obtained from two ordinary trunks is shown. In this case three simultaneous con-

In 1825 William Sturgeon discovered that by passing an electric current through an insulated wire wound several times upon an iron bar, or core, the bar became magnetised; *i.e.*, had the property of attracting small pieces of iron and steel. By using a soft iron bar, or core, the magnetisation would only exist while the electric current was flowing through the coil of wire. This magnetisation would increase or decrease as the electric current increased or decreased. It was soon found that the converse condition could be made to exist; *i.e.*, by magnetising or demagnetising an iron bar, or core, an electric current would be made to flow in the coil of wire wound upon the iron core.

Referring to Fig. 2, a variable electric current passing through the coil of wire *a-b* will cause varying degrees of magnetisation of the iron core. This variable magnetisation will, in turn, induce a variable electric current in the coil of wire *c-d*. This phenomenon is known as electro-magnetic induction, and the principle involved is that upon which the phantom coils, shown in Fig. 1, have been constructed.

Again referring to Fig. 2, a variable electric current starting at point *e*, flowing to point *f*, then dividing equally and flowing in one direction through coil *f-a* and in the opposite direction through coil *f-b*, will have a tendency to set up two opposite kinds of magnetisation in the iron core. These efforts of different kinds neutralise each other and, therefore, produce no magnetisation. Without

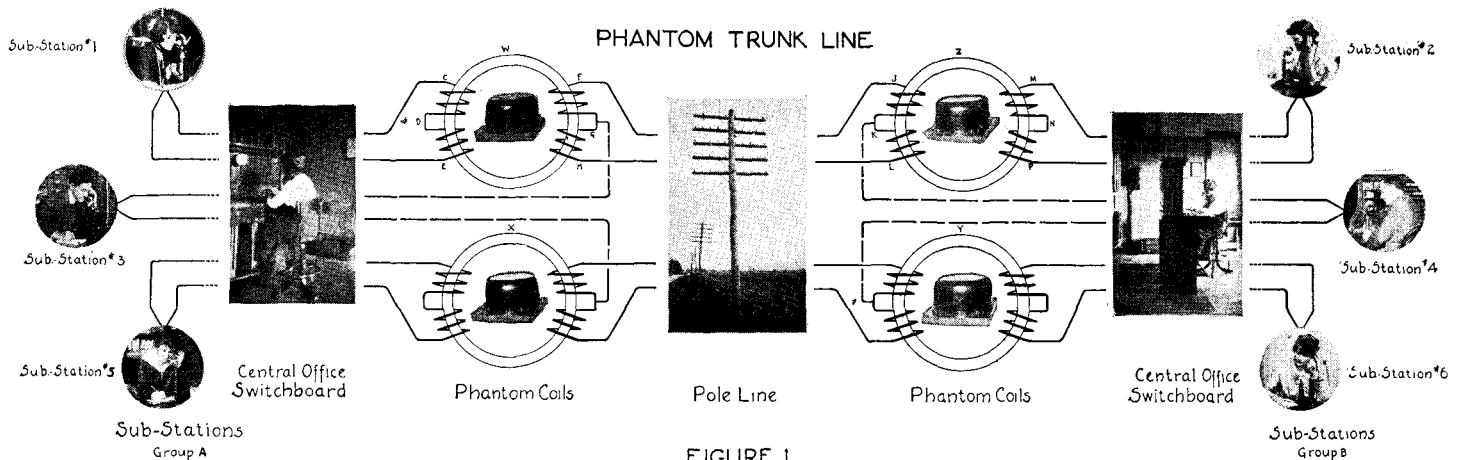


FIGURE 1

versations are being carried on over two ordinary trunk lines between sub-stations, group "A" and group "B." The women are conversing over the physical trunk lines and the men are talking over the phantom trunk line. It will be noted that the subscribers' stations are connected in their respective central offices, through the switchboards, to the phantom coils, and thence over the two pairs of wires on the pole line. In the centre of each phantom coil diagram (Fig. 1), a photograph of the repeating coil used for this purpose is shown. These coils are located in the central office with which they are associated. It should be noted that the conversations on the three trunks are going on simultaneously without interference of any kind from one another. The transmission on the phantom trunk is as efficient as that on either of the original trunks before the introduction of the phantom coils. The presence of the phantom coils, however, on the original trunk lines (over which the women are conversing) reduces the transmission efficiency of each of these circuits a small percentage. This reduction in transmission efficiency places a commercial transmission limit on the physical trunk lines used for phantoming. It has, therefore, been found advisable to route the long-haul connexions over the phantom rather than over either of the physical trunks.

It will now be seen that the phantom trunk is a telephonic parasite depending upon the two associated physical trunks for its existence. In order better to understand this parasitic condition it is considered advisable to give an elementary explanation of the principle of the electro-magnet. Upon this principle nearly the entire telephone art has been founded, and without this phenomenon the phantom trunk would not be a reality.

a magnetisation of the iron core there cannot be an induced electric current in coil *c-d*.

We may now observe how the principle of electro-magnetic induction is applied in the use of repeating coils on trunk lines to form a phantom trunk line over two physical trunks. Referring to Fig. 1, subscriber No. 1 is connected to the physical trunk line through the switchboard and, when talking into her transmitter, sets up a variable current in the telephone line which passes through

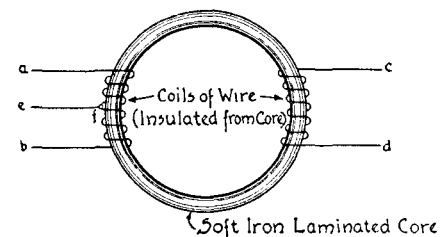


FIG. 2.

windings C, D and E of the phantom coil (W) of that office. This current sets up a varying magnetisation in the iron core of phantom coil W, which, in turn, induces a new varying electric current in windings F, G and H. The new varying current then passes over the metallic trunk line to phantom coil Z. The same electro-magnetic inductive action takes place in phantom coil Z, with a resultant variable current set up in coils M, N and P and the

subscribers' line station No. 2. Thus a complete transmission of varying electric current is produced between subscriber No. 1 and subscriber No. 2 by means of electro-magnetic induction. This trunk connexion is known as a physical trunk. The connexion between subscribers No. 5 and No. 6 is also established over a

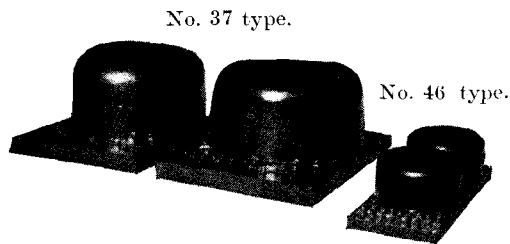


FIG. 3.—REPEATING COILS.

physical trunk line in a similar manner to that described for connexion between subscribers No. 1 and No. 2.

Again referring to Fig. 1, it will be noted that a varying current set up in the transmitter of subscriber No. 3 passes through phantom coils W and X and flows over two pairs of metallic trunk lines to phantom coils Z and Y, and thence directly through the switchboard to the instrument of subscriber No. 4. In this case it will be noted that the current passes only through one set of windings on each phantom coil, and that the flow of current is in the opposite direction through each pair of separate windings of the phantom coils W, X, Z and Y. Inasmuch as the flow of current is in the opposite direction in each winding of each coil, the efforts to set up magnetisation in the iron core neutralise each other, therefore no current is induced in the other windings of the repeating coils. By this neutralisation of the core no electric currents are set up in the physical trunk lines, and the transmission on these lines is not effected in any way by the current flowing on the phantom trunk.

In Fig. 3 is shown the old-type No. 37 and the new-type No. 46 repeating coils used for phantom trunk lines. The No. 46 repeating coil, consisting of two coils on one base, requires only about one-fourth the space required by the two old-type No. 37 coils. This coil was developed about two years ago and is used in place of the old-type coil on new installations of phantom trunks. In small central offices, the phantom coils are usually mounted on small

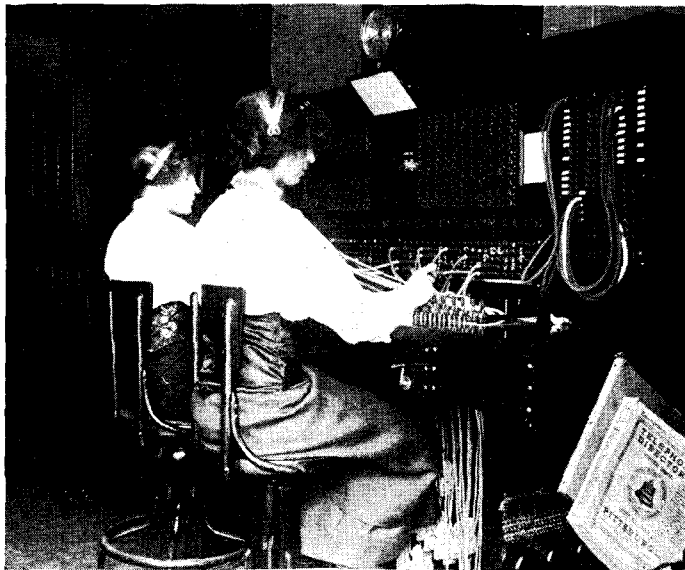


FIG. 4.—SWITCHBOARD PROVIDED WITH TEST PANEL.

iron racks on the walls and are wired directly to jacks in a test panel, also located on the wall, as shown in the central office picture at the right end of Fig. 1. Sometimes the test panel is located in easy reach of the operator, as shown to the right of the switchboard in Fig. 4. In such cases the operator can make tests or "patch"

the phantoms and physicals as directed by the troubleman, who may be at the top of a pole several miles away.

In the larger central offices, the phantom coils are usually mounted on a standard coil rack in the wire chief's office, and are wired to test jacks in the test table. Fig. 5 shows such arrangement

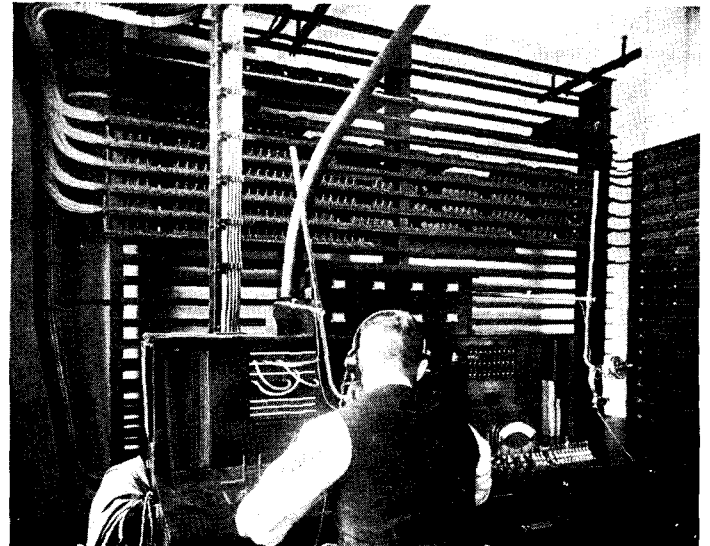


FIG. 5.—TESTING A PHANTOM.

at the Lebanon central office. The coils are mounted on the two top shelves of the coil rack. The test-table operator is testing a phantom trunk for trouble. In the left-end panel of the test table the method of patching physical trunks is shown. Double-ended cords are used for this purpose. It should be noted that every trunk line passes through a pair of jacks in this panel, thereby enabling the test-table operator instantly to "patch out" any physical trunk as desired, to clear trouble and give service in cases of emergency.

Owing to the close association and dependency of the phantom and its two physicals upon one another, the cost of the maintenance of this type of trunk is considerably higher than that for the ordinary metallic trunk line. This cost, however, is offset by the saving effected in copper-wire and pole-line work at the time of the initial installation.

In a toll central office, where a great many trunk lines terminate

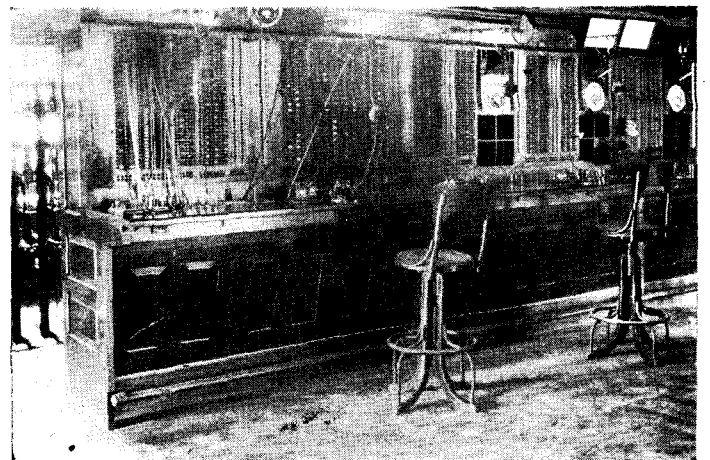


FIG. 6.—TOLL TEST TABLE, PITTSBURGH.

a special toll test table is used for "testing," "patching" and "locating trouble" on trunk lines. In Fig. 6 is shown the toll test table at Pittsburgh. All trunk lines appear in jacks in this table. An extensive system of patching trunk lines is carried on by the test-table operator, using double-ended cords.

Due to the electrostatic and electro-magnetic induction set up by neighbouring telegraph and telephone lines run on the same poles, it has been found necessary to employ some means for eliminating cross-talk and noises resulting from these inductions. This remedy is effected by the use of transpositions on the pole lines. In Fig. 7 is shown a phantom transposition on a pole line.

TYPE OF PHANTOM TRANSPOSITION

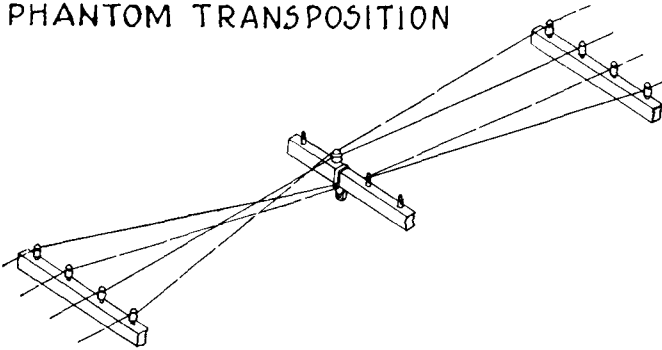


FIG. 7.

It will be noted that this consists of reversing the relative position of the trunk wires on the cross-arms. There are many transposition combinations necessary, depending upon local conditions.

It is not considered economical to place in service phantom circuits of less than four miles in length. It may be interesting, however, to note that in the territory covered by The Bell Telephone Company of Pennsylvania and its Associated Companies, there are approximately 600 phantom trunk lines operated by this company. These phantoms effect a saving of approximately 7,000 circuit miles of trunk-line wire.

TERRESTRIAL MAGNETISM.

BY ARTHUR E. COTTERELL.

FROM a practical point of view the telegraphist is of course more concerned than the telephonist with the vagaries of earth currents. The subject is a very fascinating one, however, affording much scope for interesting speculation. Though the connexion with terrestrial magnetism appears to be undoubted, and considerable knowledge exists as to some of the main features of these phenomena, so great are the complexities that the scientific world has so far been baffled in its attempts to unravel fully the mysteries, and attribute the effects perceived to a precise cause commanding acceptance.

It is usual to state in general terms that the earth is a huge magnet, the magnetic axis lying in a direction which does not coincide with the axis of terrestrial rotation. The north magnetic pole, when discovered in the year 1831, was in W. long. $96^{\circ} 46'$, N. lat. $70^{\circ} 5'$, and the south magnetic pole discovered in 1909 at E. long. $155^{\circ} 16'$, S. lat. $72^{\circ} 25'$. Certain small irregularities of magnetic declination and inclination observable on the delicate recording instruments at various observatories throughout the world are attributed to some sort of connexion between the earth and the sun, but though these variations for the most part follow a normal course of maxima and minima at or about the same hours of the day for any given place, it is not clear why the minimum declination should take place at about 8 a.m. and the maximum at about 1 p.m. if the rotation of the earth and its effect in relation to the sun is to be accepted solely. An increased range in the mean declination occurring during the summer, as compared with the winter, is attributed to seasonal changes.

The existence of small diurnal earth currents is regarded as a secondary effect of these causes.

Then there are magnetic storms during which terrestrial magnetism is strongly effected, the needles swinging from the

normal to a great extent and accompanied by vehement earth currents which seriously affect single wire telegraph instruments connected with the earth, to overcome or minimise which several well-known methods are resorted to. These magnetic storms are probably correctly attributed to solar activity, as they usually occur at periods when the photosphere is affected by large sun spots, particularly in its mid latitudes.

It is not unusual at such times for exceptional auroral displays to take place.

Although these disturbances may and sometimes do occur at irregular periods, records go to show that the phenomena recurs about every eleven years.

A not improbable theory which has been advanced suggests that on occasions of great solar activity electrons are ejected from sun spots in huge quantities with great vehemence, and in those instances when a sun spot traverses the central meridian, and consequently faces the earth, a stream of electrons on reaching this planet circles around it, and by so doing affects the terrestrial magnetism.

Although this hypothesis may well explain certain of the disturbances which are observed, it does not help us in our attempts to unravel the origin of terrestrial magnetism, nor does it seem to explain certain definite changes which occur in the course of time, such as the annual variation of the compass needle or declination needle, as the more delicate and refined observatory apparatus is termed, nor of the inclination needle. Neither does it afford any clue as to the causes whereby the declination assumes its easterly maximum at 8 a.m. and its westerly maximum at about 1 p.m., or why the range of movement should be greater in summer than in winter.

To start from a terrestrial basis we ask, "Why is the earth a magnet?" and also, "Why is the magnetic axis situated where it is?" Although we are well aware that iron is a large component part of our globe, which makes it easy to perceive a capacity for magnetism, we have to consider from whence this magnetism was derived, and as it seems difficult to attribute it satisfactorily to any causes local to our planet it would appear necessary to extend the range of our investigations.

In these circumstances we naturally turn to some consideration of the great governing orb of the solar system—the sun. Reference has already been made to the possible effect of electrons discharged in swarms from the sun, and it might appear reasonable to assume that the earth may have been originally magnetised through some such cause. Such a theory, however, appears to be difficult to reconcile with the facts, when we remember two outstanding features—viz., (a) that the axis on which the earth rotates is set at an angle of $23^{\circ} 27'$ to the pole of the ecliptic; and (b) that the magnetic axis differs eccentrically from the polar axis around which it revolves once a day. If we are to suppose that these solar electrons were the initial cause of the earth's magnetisation, we should expect to find either that the magnetic axis coincided with the terrestrial axis as a result of the electrons circulating round the earth in line with its rotative direction, i.e., in planes parallel with the equator, or that the electrons circulated parallel with the plane of the ecliptic, in which event the magnetic axis would be perpendicular thereto and consequently $23^{\circ} 27'$ from the north and south poles respectively. This latter suggestion finds some encouragement at first sight from the fact that the north magnetic pole was discovered in lat. $70^{\circ} 5' N.$, i.e., $19^{\circ} 55'$ from the north pole, and the south magnetic pole in lat. $72^{\circ} 25' S.$, i.e., $17^{\circ} 35'$ from the south pole, and such an argument may even seem to be strengthened by a remembrance that the magnetic axis is subject to variation in the course of years, as is well known to be the case, which might account for some displacement.

Although these relative positions of $19^{\circ} 55'$ and $17^{\circ} 35'$ seem to suggest some approximation to an estimated situation of $23^{\circ} 27'$ from the poles, a noteworthy discrepancy arises in regard to the longitudes in which the magnetic axis is situated, the north magnetic pole being $96^{\circ} 46' W.$, the southern one $155^{\circ} 16' E.$, a difference of $252^{\circ} 2'$, by which we see that the magnetic axis cuts the earth in a very eccentric manner.

A serious objection, however, arises in connexion with such of

the above arguments as appear favourable. We have been discussing the proposition of a magnetic axis approximately 23° from the poles as though it had a definite position in relation to the ecliptic, but it has to be remembered that the earth is continually rotating on its polar axis, and therefore an imaginary line through the earth and perpendicular to the ecliptic would be continually changing its geographical position on the earth. In other words the magnetic axis would in the north, for instance, describe daily a circle on the earth around the north pole, or alternatively be in the form of a cylinder, which we know is not the case, the geographical position remaining constant save for a trifling variation which does not normally exceed even in its higher ranges in summer about 10 minutes of arc. The proposition, therefore, could only be sustained on the assumption that the original direction of the magnetic axis so caused was influenced by the geological structure of the earth having a preponderance of iron in a given eccentric direction, with a scarcity everywhere else somewhat difficult to conceive.

Another theory is that magnetism may radiate from the sun, the lines of force therefrom spreading through space and embracing the earth, but not only does such a proposition meet with the same difficulty as to the existing location of the magnetic axis, notwithstanding the fact that the earth is continually rotating, but other physical difficulties arise.

It seems to the writer that there is a serious objection arising from the well-known fact that heat is destructive to magnetism, in which circumstances it seems incomprehensible that the sun is magnetic, unless indeed under the stupendous conditions of heat prevailing in the sun some reversal of these effects take place with which we are unacquainted. In our consideration of these questions we are confronted unfortunately with the supreme and unsolved one as to what magnetism really is, even though we know much of its structure and effects.

Seeing, however, that there are some phases of terrestrial magnetism which are clearly affected by solar-terrestrial motions, we are bound to accept the existence of some close connexion, and if it is difficult to realise a solar magnetism, it may be possible to conceive an anti-magnetic solar effect—a thought however as yet unprobed.

Remembering the enormous power of the sun; its attraction by gravity not only of our earth at a distance of some 93,000,000 miles, but on the outer planets and other systems, and the heat and light sent forth, and with thoughts also of the close connexion between light and electricity and the interweaving of electricity and magnetism, it seems at first sight not unreasonable to regard all variations in terrestrial magnetism as being due to solar influence and entirely governed thereby.

But there are very important changes continually going on which cannot be easily reconciled either with any known changes in the earth or with any known position of the earth in relation to the sun. These changes are known as the variations of declination and of inclination, of which the former is the more striking, representing at the present time an annual easterly progression of about $6\frac{1}{2}$ minutes of arc. As is well known, the most easterly variation recorded in 1580 showed the compass needle pointing 11° east of the geographical north pole, since when it travelled westerly till 1818, when the needle pointed $24^\circ 41'$ west, from which year it has been continually travelling eastwards again, the present declination being some 15° west. From computations of curves built up on the declination and inclination records it is estimated that a complete cycle is performed in about 470 years, tracing a somewhat irregular elliptical course, having approximately a major axis of 36° and a minor axis of 9° , situated within long. 25° W. and 11° E., and between lat. 66° N. and 75° N. respectively.

If these changes were caused by solar effects we should have to look for some motions affecting the relation of the earth to the sun, other than those of daily rotation and annual revolution, and it may be said, as clearing the ground, that any effects of the moon and of the other planets is so small as to be almost negligible.

Under these circumstances we must bring into our consideration four other motions, viz. :—

(1) The precession of the equinoxes, as a consequence of which there is a polar motion which describes a circle around the pole of the ecliptic in the course of about 25,965 years. The constant of this motion, however, is only 50.3514 seconds of arc, so clearly that cannot account for an annual movement of the needle amounting to some $6\frac{1}{2}$ minutes.

(2) Nutation, the effect of which lunar action causes the "precession" curve to be traced in a wavy line.

The constant of this movement, however, is only about $9\frac{1}{4}$ seconds of arc, each cycle occupying about $18\frac{3}{4}$ years, therefore the explanation cannot be described here.

(3) Variation in the eccentricity of the earth's orbit. The elliptical path which the earth traverses in a year only differs from a circle to the extent of about $\frac{1}{60}$, viz., 0.01677. This difference varies slowly between limits of .0047 and .0747, and the change occupies about 24,000 years. It will be obvious that a comparatively small variation in the earth's path in the manner indicated, spread over thousands of years, cannot account for the mean annual variation of the needle which completes its cycle in less than 500 years.

(4) And lastly, there is the great movement of the solar system through space, it being estimated that the sun is moving in the direction of the constellation of Lyra at the rate of 150,000,000 miles per annum. If we consider the 335 years which have elapsed since the magnetic records in 1580, it will be seen that at the above-mentioned rate the solar system must have travelled something like 50,250,000,000 miles, and if it be that magnetism, as is not improbable, is some great force pervading the whole universe, just as gravity does, for instance, it may be that these annual variations to which we are alluding are brought about in consequence of the earth, in this stupendous journey through space, intersecting a vast system of magnetism which radiates through all things—a line of thought which the writer suggested and illustrated in an article which appeared in the *Wireless World*, August, 1914.

REVIEWS.

Questions and Solutions in Telegraphy and Telephony. Final Examinations. By H. P. Few. Published by S. Renell & Co. Price 1s. 6d. net.—Some years ago the author of this book published a small volume containing solutions to the papers which had been set at several previous examinations of the City and Guilds of London Institute in Telegraphy and Telephony, Ordinary Grade. This book provided a means by which a candidate, especially if he were studying without the aid of a teacher, could revise his work, and gave him models from which he could acquire that examination style, accurate but brief, the want of which causes far more failures than actual lack of knowledge.

In the present book the same idea has been extended to the final examinations in these subjects. Full solutions are given to the papers for 1915. After these the questions for 1906-1914 are given. Then follow the syllabus of the examinations, tables giving English and metric measures and various useful constants, and finally answers to the numerical questions 1906-1914.

In reading through the solutions given we notice several points which we consider could with advantage be modified in subsequent editions, which we feel sure will be required, and which we hope will include solutions to the papers of several previous years instead of one year only.

Sell's Telegraphic Addresses (2,500 pp., 25s., Business Directories, Ltd., 166, Fleet Street, London).—This well-known book of reference is now in its thirty-first year. It contains a full list of all registered telegraphic addresses in the United Kingdom (compiled from official sources), and 30,000 overseas British and Foreign cable addresses. Incidentally, therefore, it serves as directory of the principal firms throughout the world, and in addition contains the telephone numbers (as far as Great Britain is concerned) and postal addresses of such firms. There is also a grouped and classified trades list which greatly adds to the value of the book as a work of reference.

"ARDENTIA VERBA.

BY H. BRISTOW (*Birmingham*).

"Full many a gem of purest ray serene
The dark unfathomed caves of ocean bear,
Full many a flower is born to blush unseen
And waste its sweetness on the desert air."

So sang the poet long ago, but his words were freshly borne in upon me recently as I read two extracts—which I propose to pass on—from a book entitled *The Progress of Science*, which came into my possession upon the death of an old friend at Brighton five years ago. It was published in 1895, and how long it was in the possession of my departed friend I cannot say, I have owned it for five years however, but have to confess that I found its leaves still uncut. Let no one reproach me, for, from the preface, after the initial cutting operation, I received a fit and proper admonition, *q.v.*:

"In this busy age people want small books on large subjects—not great works. In a town of 130,000 people, which enjoys the benefit of a public library, *The Essays of Herbert Spencer* had in six months been issued eighteen times, and of the eighteen readers out of the whole population who had felt desirous of becoming acquainted with the philosopher's views in their simplest form, not one had read the three volumes through, for the writer of the present work found pages *uncut* in them."

Bowing to this reproof I completed the cutting process, but up to the present the ingathering of fruits has not been effected, for, when all is said, it is a busy age.

I have found time, however, to scan the references to Telegraphy and Telephony, easily located, thanks to the index, and as a result am satisfied that, speaking generally, my Service colleagues have utterly failed to realise the important place which their work occupies in the scheme of things.

The comments on the sister Services which come to our notice in the course of our official duties are almost invariably the reverse of complimentary, certainly they are never laudatory, and the question as to whether we are still entitled to occupy the pedestal upon which the author of the book under review placed us in 1895, or have, since then, fallen from our high estate, is one of more than passing interest.

Now for the extracts:

- (1) From chapter headed "General Results."

"The Telegraph and the Telephone appear. And the general consequence? The whole world is transformed. Short words, these, and soon said, but slowly apprehended. THE WORLD IS TRANSFORMED! Industry and trade are ubiquitous and incessant, enlightenment spreads like a fertilising inundation, misery is reduced, health is made more secure, barbarism yields to humane influence, nations visit one another. Peking speaks with London, new continents open up new homes for the European races and nourish the old world, the Western people see trade and wealth flowing from the East, the seat of civilisation is being transferred to other climes and younger nationalities, brotherhood and kindness soften and elevate humanity, and lastly, morality and freedom extend the horizon of peace—the supreme blessing."

- (2) From the chapter headed "Material Effects."

"We have Telegraphs, Telephones, the manufacture, fitting, and working of which secure the existence of two hundred thousand families in England alone; and the use of which enables a merchant, say in the corn trade, to know the climatic situation of the day in every latitude in Asia, America, Africa, Europe, Australia; to know also the prices of every market in the world on that day, and at the same time to know also the quotations in every stock in all the exchanges of the whole world on the same day!"

With that knowledge before his eyes he is able to regulate his purchases in America, India, Russia, Australia;

to order his shipments at Odessa, New York, San Francisco, Valparaiso; to direct the landing and delivery of corn, maize, oats at Liverpool, Hull, Amsterdam, Marseilles, Trieste. He does all this from his desk in his own office. He does all this by SPEAKING to his correspondents. He does it in a few words. He speaks to 50 people in one short hour instead of sending them as many different messages, or as many written communications, most of them incomplete at best. In the course of an hour he has transacted business which would have taken six months to transact 50 years ago, and that business amounts in bulk to a hundred times more than his father would have dared to face at a time. He has not saved time only; he has also saved the salary of ten or twenty clerks; and the rapidity and increase of trade is such that the corn trade, which his father carried on before him in its entirety but on a small scale, has now been divided into 30 or 40 different branches, of which he takes up two or three only.

* * * * *

This division of labour has been explained in detail in order to show that men who would have otherwise remained unproductive trade units (clerks) have become productive springs for the fructification of capital and the expansion and remuneration of labour. The consumer, meanwhile, is the chief benefiter of the vast improvement effected by electricity, for he obtains cheaper food at an almost uniform rate without the fear of having to face either famine or famine prices. If India suffers from those two evils still, it is due to the comparative absence of scientific appliances, railway and telegraphic communication."

In the face of all this is it not outrageous that we continue to receive public criticism and complaint? Is it not just possible that we are too modest? One cannot but think that if these extracts were printed and copies forwarded to those who lodge complaints, instead of the present Departmental replies, apology would be forthcoming and the voice of the critic thereafter be dumb.

It would certainly prove an interesting, not to say lively, experiment. What could be more soothing to a subscriber who complained that he had been unable to get the exchange for three days than to read, "He speaks to 50 people in one brief hour?"

Progress!! It is retrogression that we want apparently. We have been told so often that, on Jan. 1, 1912, the Telephone Service suddenly ceased to be "worth praying for," that there have been moments when we have almost believed it. It seems, however, that it is the telephone user who has deteriorated. In 1895 "He spoke to 50 people in one short hour"—duration of call 1-2 minutes. He wants—and takes—more for his money now.

No doubt some telephone veteran will explain for my benefit and that of other telephone babes and sucklings, how the duration was kept so low. I wonder if it was a 50-party line with CQ ringing, but we shall be told all about it, perhaps by the official who furnished the traffic data.

One other observation—if the Editor wills. It seems to be a settled practice for telephone contributors to say something placatory to my old friend J. J. T., and far be it from me to ignore so praiseworthy a custom, for was not I nurtured in the telegraphic lap?

Let me then point out for his comfort and my own protection that, whilst the author states (extract (1)) "Peking speaks with London," and (extract (2)) "He does all this by speaking," the prevalence of famine in India is attributed to the "comparative absence of telegraphic communication," no mention here of the telephone.

Subsequent events have testified to the truth of the contention. Famine is less frequent in India than was the case when my book was written. J. J. T.'s official visit to India to spread the telegraph light had not then been paid.

This, I hope, will secure me a clean bill and preserve me from adverse criticism in the "Memorabilia" at the hands of an old friend. *Jucundi acti labores.*

TELEGRAPHIC MEMORABILIA.

A SCIENTIFIC contemporary commenting on the paper read by Mr. F. G. Hatch before the Junior Institution of Engineers on "Business in Engineering," says, "when the young engineer enters a works for his practical training, the one part that he never spends any time in is the *commercial offices* of the firm. . . . He knows practically nothing of such things as costs, capital charges, profit and loss accounts and balance sheets," and continuing the editor goes on to show how these same, otherwise capable men are frequently overstepped by men who commenced with no engineering training, and who thus quickly occupy the more highly paid positions.

"It may be," this periodical goes on to say, "that the technical training is at fault. Covering as it does such a mass of subjects and multifarious details, it may tend to concentrate the mind too closely on technical perfection to the exclusion of other views. This may render the receptive faculties too centred, so that later in life, engineers fail to realise those other considerations which are of such great importance," and terminates these comments by regretting that, "It certainly does seem easier for a business man, with purely commercial training and experience, to get a sufficient grasp of the general principles of engineering to enable him to control a works than it is for an engineer to get into business ways when time and advancement make it necessary for him to do so."

It is not possible to say how far this is a general rule in circles outside the Service, but judging from the many Telegraph and Telephone engineers one has met and with whom one has had the pleasure of exchanging experiences, the charge of lack of knowledge of the "commercial" side in all its relationships as regards Post Office work generally and Telegraphic and Telephonic work in particular, cannot in any way be justified. The reason for this is plain. Post Office engineers have mostly been drawn from the ranks of experienced, practical men who have been through the "commercial" mill and whose subsequent training—thanks to Treasury minutes and Post Office Accounting—never permits them to forget the financial side of schemes, designs and inventions.

One, of course, meets with the engineer, dreamer and enthusiast, whose very love of his profession blinds him to many commercial considerations, and who would be the last man to be entrusted with the control of a large body of men and machinery, if the *first* man to whom one could confide a puzzling problem. Such an one is surely an exception. Judging from what one has seen of Post Office engineers' duties and problems from time to time, as a body they must differ somewhat from the "outside" genus in their capacity for viewing commercially, at least if the criterion of this contemporary be accepted regarding the latter.

Engineers, men with technical bent amounting almost to genius, of which every telegraph office and telephone exchange has had its example, are however *born*, not made, and although M. Buehls, the predecessor of the present Chief Engineer of the Belgian Telegraph Service, once said that we should be content "if one per cent. of a staff were technical," that is to say technically enthusiastic, it cannot be said that therefore non-technical supervising officers are always a failure. It does not of necessity follow that a successful railway engineer would produce an equally successful railway manager, but doubtless managerial qualities, however excellent, could be still further enhanced by engineering knowledge, while the inverse of the case is equally true.

A judicious blending of technical, organising and managerial functions in varying proportions would doubtless produce the most suitable and capable officer in either the technical or the commercial services.

Our friends of the "Telephone side" may feel interested to read the following alleged experience of a City firm whose staff had been considerably reduced by war demands. On a particular morning the telephonist was absent, and the only possible substitutes were two young ladies, one of whom was partly deaf, while the other was a confirmed stammerer. However, co-operation being the order of the day, the temporary absentee was covered by the combined efforts of the two defectives, she of slow speech acting

as listener and amanuensis, while her companion took over the vocal portions of the operations!

It is noticed that no less a literary epicure than the *Literary World* has accorded the highest praise to the "Pen Pictures from the Front," which appeared in the January number of *St. Martin's le Grand*, and were written by Lieut. R. G. Stroud, son of Mr. G. C. Stroud of the C.T.O. Those who have read "A Soldier's Burial Under Fire," or "In Billets," could indeed only agree that these paragraphs were real literary gems, especially the latter, where the writer's hostess, "Old Mother Valaays," is depicted making morning coffee in a typical village homestead somewhere in France, and where, "as she stands by her swinging cauldron with the red glowing logs beneath, and gropes in her little boxes she looks more like the witch of Vesuvius brewing her tea of death, than dear old Mother Valaays."

Forgive the digression please, Mr. Editor, but these personal echoes of the great struggle in which the sons, and brothers, and fathers of many of your subscribers are taking so active a part, are a great temptation to occasional diversion from the strict path of matters telegraphic or telephonic. *Revenons à nos moutons*.

The highly instructive paper on "The Loading of Telephone Circuits," read by Mr. A. B. Hart before the Telephone and Telegraph Society at its meeting on Feb. 28 last, was better attended than have been some of this session's gatherings, which, incidentally, have been very unkindly dealt with by the Clerk of the Weather! Mr. Hart had a difficult task in that he attempted, with no mean success, to bring his somewhat abstruse subject down to the level of the all but non-technical and uninitiated listener by means of mechanical analogies. These, as the lecturer reminded his audience, could not be accepted as completely true, inasmuch as all analogies are apt to become misleading if carried too far. For the present writer's part the matter was most neatly summed up by the lecturer in the following words:—

"Underground telephone circuits have very small self-induction, but the effect of this self-induction tends to *prevent* the storage of energy in the capacity of the circuit, and the object of 'loading' is to *increase* the self-induction and so *further to prevent* the storage of energy by the capacity."

The discussion which followed was equally interesting, and produced one or two valuable contributions to one's general knowledge.

Thus the audience learnt with mingled pride and humiliation that the Pupin loading coil was the result of the inventor's study of our own engineer, Heaviside's, theories on the subject, while the "Krarup" system was also forestalled, although, unfortunately not fore-patented by another citizen of these Isles, a Mr. Hitch—ominous name!

So far it may be urged that this month's "Memorabilia" have little reference to the telegraph side, but the main object of accentuating these *telephone* features in a *telegraph* column is to urge telegraph readers to the study and observation of the advance and progress of telephony, just because it is in a measure the rival, however friendly, of the telegraphs. This very invention of "loading" of telephone circuits is a case in point and should be read in connexion with the long-distance telephone feat between Jekyl Island and San Francisco, *via* New York, a distance of 4,300 miles. This feat owes much of its success, if not its actual possibility, to the adoption of "loading" of the copper conductors on this route.

As a matter of interest it may be stated that the fee for three minutes' conversation between New York and San Francisco is over £4, but then the lines are held up by no less than 130,000 poles, which require the expenditure of a few dollars in maintenance alone.

It is understood that the German authorities are manufacturing some very satisfactory telegraph poles from steel wire and glass, the melted vitreous matter being poured into a mould in which strands of steel have been suitably placed, and which when cooled form a solid mass unassailable by tropical insects of a like voracity to the white ant. This from the *Telegraphentechnik*, *via* Berne.

The rapid increase and speed of wireless telegraphy may best be judged by the following figures, excerpted from the pages of the

Electrical Review. The ship stations of the world now number over 9,000, those on land over 1,000, and the total number of staff employed thereby mounts up to the somewhat astonishing figure of 18,000 men.

The adoption by Brazil of an ordinary duplex repeater served by differential Baudot relays, in place of the *translation tournante Baudot* as used in France for long distance Baudot circuits, is also announced, and may perhaps be accepted as a compliment to British engineers who have long adopted this less complicated form of repeater, not but that the *tournante* type of repeater has its advantages.

It may seem rather late in the day to review the eventful year of 1915, but one cannot well pass over the interesting columns of the international *Journal Télégraphique*, without extracting one or two interesting items. Thus, it was during 1915

That, the Danish administration adopted the 24 hours' system for indicating the handing-in time of telegrams,

That, the republic of Ecuador decided to employ the international Morse alphabet code throughout its Telegraph Service,

That, "on a également parlé de l'immersion d'un cable entre l'Ecosse et la Russie!"

That, it had been previously decided by the *Union Télégraphique* to celebrate the 50th anniversary of this useful consultative telegraph body in 1915 and in the city which was actually the cradle of its foundation, and it was also in 1915,

That, death removed the much esteemed Sir John Cameron Lamb, C.B., C.M.G., and president of the International Conference held in London in 1903, and to whose memory, says the *Journal* we join in silent salute.

J. J. T.

THE GERMAN ARMY AND ITS TELEPHONES.

(From an article by IRWIN S. COBB in the *New York Saturday Evening Post*.)

"I THINK," said Excellency von Scheller of the ordnance department as we came out into the open after a good but a hurried and fly-ridden breakfast—"I think," he said in his excellent Saxonised English, "that it would perhaps be as well to look at our telephone exchange first of all. It perhaps might prove of some small interest to you." With that he led the way through a jumble of corridors to a far corner of the captured French Prefecture of the captured French city of Laon, perching high on the hill of Laon and forming for the moment the keystone of the arch of the German centre.

So that was how the most crowded day in a reasonably well-crowded newspaperman's life began for me—with a visit to a room which had in other days been somebody's reception parlour. We came upon twelve soldier-operators sitting before portable switchboards with metal transmitters clamped upon their heads, giving and taking messages to and from all the corners and crannies of the mid-battlefront. This little room was the solar plexus of the army. To it all the tingling nerves of the mighty organism ran and in it all the ganglia centred. At two sides of the room the walls were laced with silk-covered wires appliqued as thickly and as closely and as intricately as the threads in old point lace, and over these wires the grey-coated operators could talk—and did talk pretty constantly—with all the trenches and all the batteries and all the supply camps, and with the generals of brigades and of divisions and of corps.

One wire ran upstairs to Over-General von Heeringen's sleeping quarters and ended, so we were told, in a receiver that hung upon the headboard of his bed. Another stretched, by relay points, to Berlin, and still another ran to the headquarters of the General Staff where the Kaiser was, somewhere down the right wing; and so on and so forth. If war is a business these times instead of a

romantic calling, then surely this was the main office and clearing house of the business.

To our novice eyes the wires seemed snarled—snarled inextricably, hopelessly, eternally—and we said as much, but von Scheller said behind this apparent disorder a most careful and particular orderliness was hidden away. Given an hour's notice, these busy men who wore those steel vises clamped upon their ears could disconnect the lines, pull down and reel in the wires, pack the batteries and the exchanges, and have the entire outfit loaded upon automobiles for speedy transmission elsewhere. Having seen what I had seen of the German military system, which thinks of everything and forgets nothing, I could not find it in my heart to doubt this. Miracles had already become commonplaces; what might have been epic once was incidental now. I hearkened and believed.

At his command a sergeant plugged in certain stops upon a keyboard and then when von Scheller, taking a hand telephone up from a table, had talked into it in German he passed it into my hands.

"The captain at the other end of the line speaks English," he said. "I've just told him you wish to talk with him for a minute."

I pressed the horn rubber disc to my ear.

"Hello!" I said.

"Hello!" came back the thin-strained answer. "This is such and such a trench"—giving the number—"in front of Cerny. What do you want to know?"

"What's the news there?" I stammered fatuously.

A pleasant little laugh tinkled through the strainer.

"Oh, it's fairly quiet here now," said the voice. "Yesterday afternoon shrapnel fire rather mussed us up, but to-day nothing has happened. We're just lying quiet and enjoying the fine weather. We've had much rain until lately and my men are enjoying the change."

So that was all the talk I had with a man who had for weeks been living in a hole in the ground with a ditch for an exercise ground and the brilliant prospects of a violent death for his hourly and daily entertainment. Afterward when it was too late I thought of a number of leading questions which I should have put to that Herr Captain. Undoubtedly there was a good story in him could you get it out.

TELEPHONE SERVICE.

A CORRESPONDENT writes asking for advice about his telephone, and asks whether it is true that some traders have found the installation of a 'phone a paying venture. According to his views, the service in his town is bad and the expense considerable. It is evident our friend is inclined to look upon the 'phone as an expensive luxury, and one that he prefers to vote a nuisance. The 'phone costs money, but so does every working expense. The 'phone entails intelligent service and the expenditure of time upon its use; but so does the serving of customers. Our friend contends that he has never got any new customers by its use; neither will he by merely opening a shop and making no effort to secure business. In summing up he says, "I have never heard of its (the 'phone's) good points." That is sad! The man who installs a 'phone must learn how to use it, just as an ironmonger has to learn his trade. It is true there are many who are to-day being pitchforked into trades they know nothing about; and there are many serving customers out to buy ironmongery who are feeling their way. The user of a 'phone has to do the same unless he has had an opportunity of seeing and hearing one used by an expert. The advantages of a 'phone are initiative, and they are preservative. That is, new business can be created and old business can be sustained and increased by it. That view is corroborated by many who have successfully used a 'phone in business for years, notwithstanding our friend's adverse opinion. The price charged for service, unlimited and restricted, is in some towns very high, but even the highest rates should be covered during the first few months of its use, and when once its advantages are understood the live trader cannot do without it.—*Hardware and Ironmongers' Chronicle.*

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising	{	MR. JOHN LEE.
Committee - -		MR. J. W. WISSENDEN.
Managing Editor -		MR. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

APRIL, 1916.

[No. 19.]

THE NEW UNDERGROUND TELEPHONE CABLE BETWEEN LONDON AND LIVERPOOL.

TWENTY years ago, on April 1, 1896, the State acquired by purchase the trunk lines of the late National Telephone Company, and the spasmodic character of previous development of long-distance communications, which had its origin in uncertain conditions affecting both the State and the Company, gave way to a policy of regular development which has been faithfully adhered to in the intervening years. The result is best pictured in the telephone maps of our islands. A glance at these maps shows that, except in the very sparsely populated districts, there is hardly a main road without a line of telephone poles. The provision of these lines of poles has not been carried out without difficulty. Our countrymen are proud of their island; they regard with affection the glorious roads and the trees that line them; and they have seldom welcomed, and indeed have often offered strong opposition to, the erection of lines of poles. Tact and, let us add, some statutory powers have enabled the Post Office to achieve its main purposes, but the concessions which it has frequently been forced to make in certain respects have not always been for the good of the long-distance telephone service.

The rapid increase in the number of trunk lines, however, brought its own penalty. The capacity of the main roads for lines of poles gradually became exhausted and a serious problem began to present itself as to the manner in which further development was to be provided for. The question was seriously considered whether the Post Office would not be compelled to follow the example of railway companies and obtain statutory powers to purchase

tracts of land between the principal cities on which to erect its pole lines.

Happily the solution is being found in another direction. Not so very long ago the range of transmission of speech over underground telephone cables was limited to about 40 miles. Now, through the researches of Oliver Heaviside, the discoveries of Professor Pupin and the labours of the American Telephone engineers and of our own Post Office engineers, there appears to be no limit of distance, certainly not in this country, over which efficient communication by means of underground cables is not practicable. The admirable paper which was read by Mr. A. B. Hart before the London Telegraph and Telephone Society, and which appears in our columns, gives a very clear explanation of the principles underlying underground telephonic communication.

The completion last month of the telephone cable between London and Liverpool, the most important long-distance route in this country, is a very notable achievement. Not only are the cable lines as efficient as the open lines in respect of transmission but the stability of communication which the cable affords will be invaluable. Probably in no other country are the difficulties of maintaining open lines in a satisfactory condition so great as in our own storm-swept islands, with their humid climate and tree-lined roads.

Much progress with the provision of other long-distance telephone cables cannot, of course, be made in these days when all available national capital has to be devoted to the prosecution of a purpose infinitely more important, but we may hope that, when happier times come, there will be rapid progress towards the goal of placing the long-distance telephone service in an equally satisfactory state of emancipation from our climatic vagaries as the long-distance telegraph service.

THE TELEPHONE AND THE CINEMATOGRAPH.

THE writer of our "London Notes" sounds a note of warning. He informs us that a cinematograph drama upon the subject of the Telephone Service has been launched on the American public, and that it will in all probability reach these shores. Whether it is a comedy or a tragedy he is unable to enlighten us. "But," we can imagine the stock critic of the Telephone administration crying, "how can the Telephone Service be anything but a Tragedy?" On the other hand, the cynic and philosopher will exclaim with equal confidence: "Telephone Service and Comedy—the terms are synonymous!" So we are left without guidance, and not without apprehension as to the combination of results which will be produced on the mind of a cinema dramatist when he has both "the marvels of modern science" and the long arm of coincidence at his disposal.

The telephone as seen in the picture-houses always fills us with admiration. It satisfies the two great *desiderata* of the telephone enthusiast—universality and instantaneous service. In pleasures and palaces, and in the home, be it never so humble, the telephone is ever present. We see the receiver lifted from the hook, and the subscriber (if we may so describe the hero or villain of a "gripping drama of strong human interest") at once engaged in animated

conversation with his correspondent. We see the chief of police snatch up the receiver at the other end of the line, and forthwith numerous forbidding-looking American policemen rush with commendable zeal and formidable clubs on the track of the evil-doer; or the firm-chinned detective in his luxurious armchair hears the appeal and hastens, but not too fast lest he should arrive before the nick of time, in order to rescue the half-stifed heroine, bound and gagged in some slum cellar or opium den. In our somewhat limited experience of picture-houses we do not remember to have seen a case of "line out of order"—except when the villain has purposely cut the wires—or of cross-connexion, although we doubt not that the latter has been the mainspring of some comic pieces. But comic pieces on the cinematograph are mere stopgaps, affairs of five minutes, with lame and impotent conclusions; the drama is the thing, in reels and reels (possibly so called because their contents are spun out), and here, as we have indicated, the telephone service always appears to be beyond praise.

It may be that the play to which we have alluded is of an instructive kind, designed to show the manifold complexities and activities involved in the telephone service. We should be the last to assert that drama has no part in the telephone. Its intimate association with all phases of modern life ensures the contrary. The Service could indeed be well used as the subject of a moving play, and, intelligently handled, become the motive of the most dramatic incidents. The life and work of the telephonist herself, especially in these times, would form an excellent *milieu* both for comedy and more serious drama, while the handling of lines over which so many important messages pass gives her a sort of kinship with the Fates who hold the threads of Life. It is for these reasons that we hope that the telephone, some day, may be the inspiring medium of a drama worthy of the theme.

ZEPPELIN RAID WARNINGS.

OUR readers are well acquainted with the arrangements which have been made for the distribution of air-raid warnings. Those arrangements need neither be described nor defended. But there is no harm in extracting mild amusement from the rival arrangements which are suggested by "An Expert" in the *Daily Express*. So we reprint the article, and we leave it to the sense of humour of those who read it. This expert clearly does not understand the arrangements which have been made, nor does he appreciate the importance of the necessity for passing authoritative warnings from a central point. "A good deal of unnecessary delay would be avoided," he says, "if each coast town advised one town about ten miles distant by telephone, a second town twenty miles inland by telegraph, and further a large inland town which could retransmit to other towns. The coast towns would of course communicate with each other in the usual way." A very ordinary imagination can conjure up a picture of what would happen. The flood of telegraph and telephone advices, in and out and along the coast, would add a terror even to Zeppelins. But "this would ensure that every Post Office telegraphist and telephonist was being employed." It would.

HIC ET UBIQUE.

IN an American economic monthly we notice a brief review of a work entitled "Selected Articles on Government Ownership of Telegraph and Telephone." It is one of a series of debaters' handbooks, and we are wondering what manner of book it can be. The reviewer says: "Apparently the arguments on both sides have been balanced as carefully as possible." We have no intention of disparaging a book which we have not seen, but nevertheless, in the mind's eye, we can conjure scenes which would delight the comic spirit when a debating society, greatly daring, tackles this momentous and highly contentious subject, primed by a shortish primer, having wrestled with statistics of doubtful value and the most complex political and social arguments for and against. Telephone and telegraph statistics, for instance, require the handling of an expert, for the reason that they have, if we may so express it, no common denominator.

THE Guernsey telephone system showed an increase, though small, in 1915, despite the war. The number of subscribers' lines rose from 2,162 to 2,197. The total number of telephone calls increased from 1,571,721 to 1,590,492. There was a decrease in the net profit of £229 and in the gross revenue of £19.

TELEPHONIC communication was established on Feb. 14 between Montreal and Vancouver, a distance of 4,000 miles. This must be easily the longest distance over which two British towns have yet been connected by telephone. The line, however, did not follow a Canadian route but communication was afforded *via* Albany — Buffalo — Chicago — Denver — Portland — Spokane — Seattle.

WE do not know how the message "Home Forces warnings" became transformed to "Home Horses warning" at a certain military camp on an extremely cold night recently; but the officer who ultimately got the message was so perplexed that luckily he sought further instructions before interfering with the comfort of his "gees."

WE understand that the staff in District Offices and Post Offices entirely dissent from the view that the young men of the Auditing staffs should be starved as indispensable. We have even heard it suggested that the Audit Office ought to encourage the patriotism of its staff.

THE BATTLE OF THE BAWBEES AT DUNDEE.

ON the roof of the United Free Church at Albert Square, Dundee, there is a telephone standard which was erected by the National Telephone Company in 1897 at a wayleave rental of £7 per annum, excluding the cost of repairing damage caused by the strains on the standard or by the workmen. We know at least one engineer who regards such structures as things of beauty; but apparently that view is not shared by the secular guardians of the church. Soon after the transfer an underground cabling scheme was prepared on the completion of which the overhead wires on this standard were to be removed and the standard recovered; but, owing to the outbreak of war and the consequent depletion of engineering staff, it was necessary to postpone the underground work at Dundee, as elsewhere. The wayleave on the U.F. Church was provided under an agreement subject to six months' notice and, in April 1915, the Deacons' Court, with a full knowledge of the facts, gave notice for its termination on the ground that the rent which had been in force for eighteen years was inadequate. They however expressed their willingness to consider any more remunerative proposition for the continuance of the standard, the terms asked for by them two months later being £12 per annum, under an agreement subject to one month's notice. As the wayleave payment was already far above the average for similar fixtures throughout the country,

and a matter of principle was involved, the Post Office not unnaturally objected to the increased rate, and a lively correspondence ensued between Headquarters and the representatives of the Deacons' Court. The Telegraph and Telephone Advisory Committee supported the Postmaster-General; but the Deacons' Court were not prepared to give way, although the Post Office informed them that, in view of the impracticability of removing the wires until the underground work was finished, it would be necessary, if the notice were persisted in, to withdraw the telephone services from their fellow-citizens concerned. The Chamber of Commerce, who had carefully considered the whole correspondence, asked the Postmaster-General to use the powers provided by the Defence of the Realm Act to prevent the removal of the standard, as any interruption of the local connexions might well become a matter of great concern to the local military headquarters. But the Deacons' Court remained obdurate and in the quaint terms in force in Scotland stated that since the date of expiry of their notice the Postmaster-General had been "a trespasser and a squatter" upon the property of the congregation liable to immediate ejection with or without previous legal process. After consultations between the War Office and the Post Office an order was made under the Defence of the Realm Regulations by the Commander-in-Chief of the Scottish Command that the standard and wires attached thereto be maintained and not removed. As any disobedience to this order is an offence under the Regulations, there the matter rests at present.

The following extracts from the *Dundee Advertiser* show a humorous side of the controversy:—

"Deacons' Courts are notoriously mercenary bodies, making up for their rigid exclusion from spiritual matters by a vigorous custodianship of church interests in the vale of tears. It will surprise nobody who knows them in general to learn that the deacons of Albert Square had the happy thought of screwing up the rent of the standard which in none too orthodox a fashion adorns the sacred edifice under their control. Times are hard; there is a war on; three-penny pieces, it is hinted, are not showered in the plate in their old profusion. Peradventure the contributions of the Central Fund are manifesting a tendency to shrink in upon themselves. These are matters of which we have no knowledge, and merely hint at them in a suggestive way.

Probably the whole controversy arises out of misunderstanding. Mr. Walkley, who has been holding up the Post Office side of the correspondence, probably thought he was dealing with a species of elders, therefore soft vessels open to emotional pressure, men with other-worldly tendencies. And all the time he was really at grips with deacons, hardened by long practice in the art of massing threepenny pieces into pounds. If only he had known he would have paid up without a murmur, with at most a sigh on the hopelessness of trying to baulk them of £5 on which their hearts were set."



MR. C. F. SPEARS.

CONCERT AT LEYTONSTONE IN AID OF WOUNDED SOLDIERS.

A concert, organised by Misses G. EDGLEY and MOTT, of East Exchange, was held on Jan. 24, 1916, at Barclay Hall, Leytonstone, to provide comforts for our wounded soldiers. It was attended by a large and appreciative audience, and realised a clear profit of £16 2s. 6½d., £8 2s. 6½d. of which was given to the East Exchange War Fund, and £8 to St. John Ambulance Society.

WE publish a portrait of the late Mr. C. F. SPEARS, Contract Manager at Blackburn, whose obituary appeared in our March issue.

THE LOADING OF TELEPHONE CIRCUITS.*

BY A. B. HART (*Engineer-in-Chief's Office*).

IN writing this paper I have endeavoured, in accordance with a stipulation that it should not be highly technical, to present the subject in an elementary form; but if I have gone too far in the direction of simplicity I tender my apologies to those members who are already acquainted with the science.

Let us consider first the current flowing in a simple circuit consisting of a battery and a loop of wire. In accordance with Ohm's law the current is proportional to the voltage of the battery and inversely proportional to the resistance of the whole circuit. Also it follows that the current is the same in all parts of the circuit. We may now consider the circuit as consisting of a battery, one pole of which is earthed, and a length of wire, which is also earthed at the distant end. Here again the current is proportional to the voltage and inversely proportional to the resistance, but the statement that the current is the same in all parts of the circuit may need some qualification. Let us assume, for instance, that the wire, which may be ten miles long, is not well insulated throughout its length.

If we now take reading from galvanometers inserted in the circuit at the ends of the circuit we shall observe that the sent current is greater than that received, the reason being of course that some of the outgoing current has been lost through the faulty insulation, or we may say that the outgoing current has been attenuated. Let us now assume that instead of a single wire earth return circuit we have a double wire, or, as we call it, a metallic circuit. And let us insert galvanometers as before. If the insulation of these wires be of the same order as in the previous case, we shall see the same attenuating effect on the line current.

Up to this point we have considered only a continuous current, but in telephony the currents due to speech are alternating, and only within certain limits can an alternating current be considered as obeying Ohm's law. The alternating current is represented graphically by a sinuous line oscillating above and below a straight line, and the alternating current does, in fact, rise gradually from zero to a maximum value and gradually fall to zero, then reverses and falls to a minimum and gradually rises again to zero. The interval of time during which the current goes through this cycle of change is known as a "period," and the frequency of these changes is described as "periodicity." Thus we say that the periodicity of an alternating current lighting circuit may be 50 periods per second, whereas in a telephone circuit it may be 1,000 periods per second. As a matter of fact the average periodicity in a telephone circuit is agreed to be somewhere about 800 per second.

Now when we have to deal with currents of telephonic frequency we find that we are concerned with many other factors than those we were considering in simple, continuous current circuits. In addition to resistance and insulation we have to consider electrostatic capacity, self-induction and leakage. If we could have a circuit possessing negligible resistance, capacity, self-induction and leakage, and if we could impress an alternating current of telephonic frequency upon it, the current at the distant end of the circuit would be the same as that at the sending end. But as all telephone circuits possess the qualities specified in some degree or other, we find that the sent-out currents are definitely attenuated according to the circuit length. The power of the current to operate a telephone receiver may be considered as being proportional to the distance between the maximum and minimum of wave-form taken at any point on the line. If our telephone circuit had resistance only the wave-form of the line current at the receiving end would be the same as at the sending end, but the effect of the electrostatic capacity and the self-induction of the circuit is to distort the wave-form of a sent-out current. Secondly, the wave-form of the received current in a long telephone circuit is not only much attenuated, but is also distorted. The attenuation alone results in diminished volume of sound in the receiver. But the effect of the distortion is to interfere with the articulation of the speech. As many telephonists know, we sometimes find circuits where the received sound has good volume but poor articulation. On the other hand, we have frequent experience of circuits where the articulation is perfect but the volume of sound is very small. Very long aerial circuits will give the latter effect, whereas the former is observed on some classes of underground circuits.

The differing effects of electrostatic capacity and inductance of telephone circuits were recognised early in telephone engineering work. It was shown that these effects opposed one another, and it was proved mathematically that it should be possible so to adjust the electrostatic capacity and self-induction of a telephone circuit that it would transmit speech in the same way as a circuit which possessed neither of those characteristics. In practice, the problem has resolved itself into adding self-inductance to telephone circuits which inherently possess high electrostatic capacity, and hence the term "loading."

It has occurred to me that the term "loading" is liable to misinterpretation by those not well versed in telephone engineering, because in everyday language the word implies a process of filling up whether applied to guns or to carts and wagons. It sometimes conveys the idea of an encumbrance. But when we use the term in telephone engineering, although we are actually adding weight to a circuit when we load it, we are not slowing it down in the same sense that a goods train is slowed down as its weight is increased by adding trucks. It is very difficult to describe an easily understood analogy

* Paper read before the Post Office Telephone and Telegraph Society of London on Feb. 28, 1916.

to the loading of a telephone circuit, and analogies of scientific propositions are seldom correct, although they may sometimes be very useful. However I think the scope of this paper will permit me to attempt an analogy in this case.

If I take a yard of string and holding it by one end whirl it about my head I shall have to exert considerable force to keep the string going against the friction of the air. If now I attach a small weight to the end of the string I shall perhaps have a little difficulty to get it to start whirling, but once started it will require little power to keep it going. The reason is that the weight has added momentum to the string and enables me to force it more easily against the resistance of the air.

Now this is some indication, although incomplete, of what happens in a telephone circuit when we load it. In effect we add momentum to currents impressed on it, and thus assist their propagation against the resistance of the circuit.

In this country, loading has been almost entirely confined to underground circuits, as the scope for loading overhead circuits is very small indeed. Underground telephone circuits have relatively high electrostatic capacity and very small self-induction. The effect of electrostatic capacity alone in a telephone circuit is to store up the energy of the impressed current at a certain instant of time and to release that stored-up energy at other instants. It does not absorb or destroy the energy, but the effect of the alternate storing and releasing of the energy opposes the current impressed on the circuit at the sending end. The electrostatic capacity of an underground circuit may be considered as being equally distributed throughout its length, and the effects which have just been described take place over the whole length of the circuit.

Secondly, the impressed current which may have an amplitude represented at the sending end of a circuit 25 miles long by, say, 100 is reduced in amplitude at the receiving end to a value represented by six. This may seem a very startling reduction, but it is exactly what happens on an average circuit between a London and a Liverpool subscriber where the speech is commercially very good. On a long telephone circuit, where the transmission approaches the commercial speech limit, the received current will be less than 1 per cent. of the sent current.

As I have previously mentioned, underground telephone circuits have very small self-induction, but the effect of this self-induction tends to prevent the storage of energy in the capacity of the circuit, and the object of loading is to increase the self-induction and so further to prevent the storage of energy by the capacity. In practice the inductance of a circuit is increased by the insertion of inductance or loading coils at regular intervals.

I will now attempt to describe briefly what a loading coil is. It is nothing more or less than an electro-magnet of special design, and consists of a core of iron wire wound over with a certain number of turns of insulated copper wire. In practice the core is made up in the form of a ring for reasons which we need not consider here.

Reverting to our simple diagram of a circuit, consisting of a battery, a galvanometer and loop of wire, let us now insert an electro-magnet, and in a simple circuit we shall find that the current is reduced by a value depending on the resistance of the winding of the electro-magnet. We shall probably notice, however, that as we complete the circuit there is a momentary kick on the needle of the galvanometer, and if we break the circuit there is a kick in the opposite direction and probably a spark at the point where the circuit is broken. The kicks on the needle and the spark are due to the inductance of the electro-magnet. If we now insert this electro-magnet in a circuit on which an alternating voltage is impressed, we shall find that the reduction of current does not correspond to the reduction observed in the continuous current circuit. It will be found to be considerably more, because the electro-magnet offers greater resistance to an alternating voltage, and this resistance increases with the frequency of the current.

If we replace the solid iron core by a core made up of a bundle of thin iron wires we shall find that the resistance to alternating currents is diminished, because in the solid iron core some of the energy of the current is frittered away in heat due to what are known as "eddy-currents." The eddy-current losses in the wire core are negligible as compared with those in the solid core, but even in the wire core these losses have to be taken into account. The standard loading coil now used by the Post Office has a resistance with steady currents of about 3 ohms, but with alternating currents of telephonic frequency the resistance is nearly doubled. Thus it will be seen that when we load a telephone cable by inserting inductance coils we are also adding resistance to the circuit, and one of the most difficult problems to be solved by the designers of loading coils is to obtain the necessary inductance with the least possible resistance. Very great improvements have been made in this respect in the latest types of high-grade inductance coils, but their very great cost has hitherto precluded their general use.

I have here on the table a specimen of our standard loading coil. For general use in loading underground circuits these coils are encased in watertight cast-iron boxes filled with insulating compound. The size of the case is determined by the number of coils required at the loading point, and the number of coils, of course, is determined by the number of circuits which it is desired to load. The cast-iron cases are furnished with short lengths of cable which are spliced into the main line cable. The coil cases, or coil pots, as we generally call them, are placed in underground brickwork chambers or manholes through which the main line cables pass. These loading points are generally spaced about $2\frac{1}{2}$ miles apart, so that in a loaded circuit 100 miles long we should get 40 loading coils.

The work of jointing in the loading coils is highly skilled, and extraordinary care is required in all the operations. The handling of the cases themselves from the time when they leave the factory to the time when they are finally placed in position requires great care. Where heavy cables are concerned the standard 50-coil case which is generally supplied weighs nearly 1,200 lbs. complete. It can readily be imagined that the work of dropping these cases through a narrow manhole entrance requires some care. The jointing of the coils into the cable requires very careful preparation on the part of the jointer and his assistants, and concentrated attention on the work until the joint is completed.

The procedure is as follows:—The coil box having been placed in position in the manhole, the jointer and his assistants will dress the coil case cables so that they lie in line with, and overlap the ends of the main cable. The ends of the main cable are then opened and the circuits which are to be loaded are picked out and marked. Then the ends of the coil case cable are taken in hand. A rapid test is made to prove that the circuits are continuous through the coil cases and that the insulation of the coils and loading-out cables is perfect. The coil case cables are then spliced into the main cable and the lead sheathings are sealed by plumbers' wiped joints. During the whole of these operations great care must be used in keeping the paper cover of the wires clean and dry, and before the joint is finally sealed up it is heated by blow lamps so as to drive out any moisture that may remain in the paper.

In another method of jointing which has recently been introduced the uncovered ends in the main cable are steeped in hot paraffin wax directly the lead sheathing is removed, the paraffin wax having high insulating properties when properly used.

One of the most important developments in telephone cable work has been the introduction of a system of cable manufacture and jointing which has resulted in obtaining perfect superposed or phantom circuits. Most telephonists, particularly those who are concerned with long-distance work, have had experience in working superposed circuits, and they know what an elusive thing a superposed circuit has been. But we are now providing cables in which the superposed circuits are equally as stable and reliable as the physical circuits, and of much greater efficiency.

It is not within the scope of this paper to describe the processes of manufacture and jointing of these new cables except so far as the loading of these superposed circuits is concerned. The loading coils inserted in the physical circuits have no loading effect on the phantom circuit, and special loading coils are required for the phantom. All four wires of the cable unit are wound on the phantom circuit coil. This coil has now been brought to a state of perfection, and although its cost is double that of the physical circuit coils its use is justified easily on economical grounds where phantom circuits are to be worked in loaded cables. That is to say, if the phantom circuits are going to be used all in a loaded cable it pays to load them.

CONTINUOUS LOADING SYSTEM.

I will now describe briefly another system of loading where inductance coils are not employed. If we take a length of copper conductor and wind on it a close spiral of very fine soft iron we shall find that we have added a considerable amount of self-induction to a circuit formed on this conductor. We have, in fact, loaded the conductor. This system of loading is known as the "continuously loaded" system or as the "Krarup" system. Continuously loaded cables have not hitherto been used by the Post Office in practice, although extensive trials have been made on experimental lengths. But a number of continuously loaded cables is in use on the Continent, especially in Denmark, where the system was first introduced.

Greater circuit efficiency can be obtained on a given weight of conductor with the loading coil system than with the continuously loaded system, but the latter presents some possible advantages in submarine cable work. A continuously loaded submarine cable was laid by the French Administration between England and France in 1912 and has given very good results. Fortunately it is laid alongside a coil loaded cable; and opportunity has been taken to compare the relative merits of these cables. As the capital cost for a given efficiency is higher in the case of a continuously loaded cable, and as the maintenance costs are probably equal, it seems unlikely that continuously loaded cables will come into general use. But there are exceptional cases where continuously loaded cables may prove in.

ECONOMICS.

It is probably well understood that the efficiency of conductors in underground cables varies with the diameter and consequently with the weight of the conductor, but the efficiency does not vary directly as the weight, that is to say, if we double the weight we do not double the efficiency. The following table shows the relative efficiencies of conductors with weights per mile from 10 lbs. to 300 lbs. If we compare 20-lb. conductors with 40-lb. we see that although their weights are 1:2 their relative efficiencies are 1:1.4 approximately. Again, let us compare 20-lb. with 100-lb. Here the weights are 1:5 and the efficiencies 1:2.5, or further, comparing 150-lb. with 300-lb. the weights are 1:2 but the relative efficiencies are 3:5. In this case, as in the comparison between the 20 and 40 lbs., we have doubled the weight of the conductor. In the former case we obtained an increase of efficiency of 40 per cent. and in the latter case the increase is of the same order, but, whereas in the former case doubling the conductor meant an increase in weight of 20 lbs. per mile per wire, in the latter case it involves an increase of 150 lbs. per mile per wire.

Transmission Efficiency of Conductors in Lead Covered Air-Space Paper Core Cables in terms of Standard Cable.

Weight per mile of single wire.	Unloaded loops per mile.	Loaded loops per mile.
10	1.63	.95
20	1.00	.47
40	.72	.26
70	.54	.15
100	.44	.13
150	.34	.097
200	.28	.082
300	.20	.05

The values quoted above do not include terminal losses, and they are only correct for circuits of greater length than 10 miles.

Now in considering the capital cost of a circuit in an underground cable there are other factors to consider than the weight of the conductor. For instance, the lead sheathing, the cost of providing and laying pipes and ducts, jointing chambers, useful life of a cable, its scrap value when recovered and the cost of recovery. The number of conductors that can be contained in one pipe varies, of course, with the size of the conductors. The largest practicable cable has a diameter of 3 inches approximately, and in a lead sheath of this size are usually lay up conductors as follows:—

10 lbs.	...	...	...	800 pairs.
20 "	...	...	...	300 "
40 "	...	...	...	125 "
70 "	...	...	...	100 "
100 "	...	...	...	74 "
150 "	...	...	...	48 "
200 "	...	...	...	38 "
300 "	...	...	...	28 "

The scrap value of recovered lead-covered telephone cable is very high and may be taken approximately as about 80 per cent. of its value, but the cost of recovery has to be deducted from this.

In estimating the cost of loading telephone circuits we have other factors than those mentioned above to consider. There is, of course, the cost of the loading coils and the cost of installing them; but in addition we have heavier charges for jointing chambers and higher labour charges. But when we come to figure the scrap value of the loading coils we find that it is almost negligible as compared with their first cost; and this consideration is a most important one in estimating the charges on loading cables.

Now let us suppose it is required to provide 50 junction circuits between two exchanges which are 10 miles apart, the minimum efficiency of the circuits to be equal to 9 miles of standard cable. Referring to our table of conductor efficiencies, Fig. 5, we see that 100-lb. loaded conductors have an efficiency of 41 miles of standard cable per mile. Consequently the 10-mile circuit would have an efficiency of 5.2 miles of standard cable. We can accommodate 50 pairs of 100-lb. conductors comfortably in a 2½-inch cable. Alternatively we can see that 40-lb. loaded conductors would meet the requirements. They would have an efficiency of $26 \times 20 = 5.2$, but in this case we have to make an allowance for terminal losses which cannot be taken as less than 2½ standard miles, so that overall efficiency of the circuits would have to be taken as 7.7 standard miles. A 50-pair 40-lb. cable has a diameter of less than 2 inches and of course would go easily in a 3-inch duct.

The first costs of the 100-lb. and 40-lb. cables respectively are as 19 : 11, but when the loading coils for the 40-lb. cable are added the comparison is as 19 : 12. Although the maintenance charges will be rather higher in the case of the loaded cable, the total annual charges will be much less. Consequently a loaded cable would be laid in this case.

On the other hand a loaded cable is frequently more costly than an unloaded cable of greater conductor weight, but of equal efficiency when the distance between the points to be connected is small, say less than ten miles; but in a case of this kind if it is known that there will be extension to other lines of a large number of the circuits, for the sake of uniformity and overall efficiency, it may be economical to provide a loaded cable.

CONCLUSION.

In conclusion I would point out that we have probably not reached finality in the science of loading telephone cables, and many improvements may be expected; but we see looming up in the near future another triumph of increasing science which, I believe, will at first be a friendly co-operator with loading; will then be a competitive rival; and may finally eclipse loading altogether. I refer to the telephone relay; but that requires another story which may be told at some future time; in the meantime the American newspapers have been and no doubt will be telling us a good deal about the subject of transoceanic telephony, and we must not forget the moral of the first S's which were transmitted across the Atlantic by wireless.

IMPROVEMENTS OBTAINED BY LOADING.

The amount of inductance added to a telephone circuit by the insertion of standard loading coils spaced two and a half miles apart is 50 millihenrys per mile. (The millihenry is the unit of inductance in telephone work.) The improvement obtained by this amount of loading is, on the average, such as to make a loaded circuit of a given gauge about three times as efficient as an unloaded circuit of the same gauge. The rate of improvement in efficiency increases slightly with the increase in gauge of conductor; but the rate of saving of copper increases much faster. This will be evident from a study of the values shown in the table of conductor efficiencies.

For example, 20-lb. loaded conductors may be taken as equivalent to 70-lb. unloaded conductors and show a saving in copper of 50 lbs. per conductor mile; whereas in taking 100 lbs. loaded as equivalent to 300 lbs. unloaded we have a saving of 200 lbs. of copper per conductor mile.

Now it may well be asked whether increasing the amount of inductance in a telephone circuit gives a corresponding gain in efficiency; in other words would the insertion of more loading coils, or the use of loading coils having higher inductance, result in more efficient circuits. The answer is "Yes, within certain limits"; and our present standard loading is a compromise.

There is a limit to the amount of loading which may usefully be added to a telephone circuit. That limit is reached when the amount of added inductance exactly counteracts the inherent electrostatic capacity of the circuit. If inductance is added beyond this point the circuit is said to be overloaded and its real efficiency may be less than that of an unloaded circuit.

But in practice the limit of added inductance is reached before the circuit is fully loaded; and although a full explanation of these statements requires complex mathematics, it is possible to obtain a fairly good idea of the matter without them.

I may say at once that in America it is standard practice to load long telephone circuits much more heavily than in the Department's practice; and the divergence between these practices is due to the different conditions of telephone lines in America and the United Kingdom respectively. Each is correct within its own sphere of operations.

Where any change occurs in the composition of a telephone circuit, say at a junction between an overhead line and an underground cable, there are electrical conditions set up giving rise to transition effects on currents passing the point of junction; and if the electrical characteristics of the lines on either side of the junction are very different the transition effects may be of considerable magnitude. Similarly at the point of connexion of the speaking apparatus to the line there may be transition effects. Unfortunately these transition effects are nearly always efficiency losses and where they occur at the apparatus they are known as terminal losses.

It is essential to design speaking apparatus so that these losses are as small as possible; but as the characteristics of line circuits vary between wide limits it is evident that the design of apparatus must be a compromise in this respect. It is also evident that the ideal telephone line is one that is of the same composition throughout.

When speaking apparatus is connected direct to a loaded circuit the terminal loss may be large in comparison to the improvement that should be obtained from the loading; and these terminal losses increase in proportion to the amount of loading in the circuit. In practice, telephones are seldom or never connected direct to loaded lines; there are nearly always intervening lengths of unloaded conductors.

Some idea of the magnitude of these terminal losses may be gathered from the following examples.

I should explain here that terminal losses are independent of the length of a circuit; they are governed only by its composition. The losses are stated in terms of equivalent lengths of standard cable. Thus if a circuit has a standard cable equivalent of ten, and there are terminal losses of two miles of standard cable when the apparatus is connected, the overall equivalent of the circuit is twelve.

A 50-mile length of 70 lbs. unloaded cable has a standard cable equivalent of 27; and when loaded with 50 millihenrys per mile the equivalent is reduced to 9. When extended to average subscribers' telephones at each end with average intermediate conditions, there will be a terminal loss equal to about two and a half miles of standard cable at each end: so that the real value of the loaded circuit is 13.

Now if the loading on this circuit be increased to 200 millihenrys per mile, the equivalent will be reduced from 27 to 5; but the terminal losses under the same conditions as before will amount to 8 miles of standard cable giving a real value of 13; the same result as with the light loading. Thus the heavy loading is the less efficient in this case.

But now assume that the circuit is four times as long as before, i.e., 200 miles. The equivalent of the unloaded circuit will be 108. With 50 millihenry loading this will be reduced to 32; and the terminal losses (which as I have said are independent of length) will bring the real value up to 37. With 200 millihenry loading the equivalent will be reduced from 108 to 22; and adding the terminal losses of 8 miles, the real value will be 30; so that in the longer circuit the heavier loading gives the better result.

As a general statement it may be said that the longer the circuit the heavier may be the loading; always provided that the circuit is not overloaded.

Special apparatus has been devised, and is in general use in America, for reducing terminal losses on loaded circuits to very small values. The apparatus consists of a particular type of transformer which is connected to the end of the loaded circuit. In the case of heavy loading described above these transformers would reduce the terminal losses from ten to somewhere about four miles of standard cable.

In this country the loaded cables (with one exception—viz., the London-Birmingham-Liverpool cable) rarely exceed 50 miles in length; and as only light loading is employed the use of terminal transformers is not imperative; but in the case of the particular cable just mentioned terminal transformers are provided. One reason why terminal transformers are not generally used in this country is the fact that they make automatic signalling practically impossible; and automatic signalling is a *sine qua non* with us.

Speaking as a transmission engineer I have often wondered why we cling so tightly to the automatic signalling idea. Any system of automatic signalling on telephone circuits means loss of speaking efficiency; and the more complex the signalling the less efficient the speaking.

The ideal transmission circuit would carry no signalling apparatus at

all; the signalling for a group of such lines would be done over a special signalling circuit, but there might be some difficulties in working such a scheme in practice, although I quite believe our traffic experts could find a way out if such conditions were unavoidable.

The terminal transformers just mentioned serve another useful purpose besides reducing terminal losses in loading circuits; they act as protectors; and this point leads up to another aspect of the subject of loading.

PRECAUTIONS TO BE OBSERVED IN USING LOADED CIRCUITS.

On account of the materials used in manufacture and because of the peculiar methods of design of loading coils to obtain high efficiency, they are susceptible to deterioration, or even actual damage, from causes arising out of the ordinary methods of operating telephone circuits; and somewhat elaborate safeguards are necessary to reduce these risks to a minimum.

If a current exceeding a certain value is passed through the windings of a loading coil for even an extremely short period of time, say a tenth of a second, the iron core suffers a permanent magnetic set. The effect of this magnetic set is to reduce the efficiency of the loading coil. It can be partially but never completely restored by application of a treatment similar to that used in dealing with a magnetised watch. A succession of such accidents and restorations will result in a marked depreciation in the efficiency of a loading coil.

Some loading coils which were recently recovered after having been in service for ten years were specially tested with a view to ascertaining their efficiency as compared with their condition when new. It was found that in some cases there was a depreciation of 15 per cent. Restoration methods were applied, but in no case could the efficiency be brought nearer than within 5 per cent. of the original value. Possibly some of the depreciation was due to ageing effects on the iron cores, and this cause has been the subject of investigation; but much work has to be done before any very definite information can be obtained.

The subject of ageing effects on iron has received much attention from designers and manufacturers of dynamos, motors and other machinery and apparatus where electro-magnets are concerned; and our problem in connexion with the life of loading coils is a similar one.

In practice, the leads connecting loaded circuits with ringing machines, automatic signalling batteries, testing generators and batteries are equipped, in addition to the ordinary fuse protectors, with resistance coils so adjusted that a current exceeding a certain value cannot pass under any conditions.

All loaded circuits are distinctively labelled with green labels on main frames, test boards, &c., for the guidance of testing officers.

CONCLUSION.

In conclusion I would point out that we have probably not reached finality in the science of loading telephone cables, and many improvements may be expected; but we see looming up in the near future another triumph of engineering science which, I believe, will at first be a friendly co-operator with loading; will then be a competitive rival; and may finally eclipse loading altogether. I refer to the telephone relay; but that requires another story which may be told at some future time. In the meantime the American newspapers have been and no doubt will be telling us a good deal about the subject of trans-oceanic telephony, and we must not forget the moral of the first S's which were transmitted across the Atlantic by wireless telegraphy.

OUR MONTHLY RECORD OF NAVAL AND MILITARY HONOURS.

THE following members of the staff connected with the Telegraph or Telephone Services have been mentioned in despatches or have been honoured by other marks of distinction. The Editor will be greatly obliged if surveyors, superintending engineers, or postmasters will, where possible, send him photographs of the officers concerned and any available information with respect to the deeds for which they have been honoured.

Second Lieut. N. F. CAVE-BROWN-CAVE, Royal Engineers, Signal Service (Assistant Engineer, Engineering Department, North Wales District), has been mentioned in despatches.

Captain E. A. LEWIS, Royal Engineers, Signal Service (Chief Inspector, Engineering Department, North Wales District), has been mentioned in despatches.

Lieut. F. H. WOODROW, Royal Engineers, Signal Service (Assistant Traffic Superintendent, Class I., Telephones, Nottingham), has been mentioned in despatches.

Sapper F. V. JONES, Royal Engineers, Signal Service (Skilled Workman, Class II, Engineering Department, N.W. District), has been mentioned in despatches a second time.

Sapper W. C. McCLELLAND, Royal Engineers, Signal Service (Unestablished Skilled Workman, Engineering Department, West Scotland District), has been awarded the Distinguished Conduct Medal.

Serjeant D. MILLER, Royal Engineers, Signal Service (Assistant Superintendent, Class II, Glasgow), has been awarded the Distinguished Conduct Medal.

Lance-Corporal E. BEYNON, Royal Engineers, Signal Service (S.C. & T., Aberdare), has been awarded the "Médaille Militaire" (French).

Lance-Corporal C. T. HENDLEY, King's Royal Rifles (Labourer, Engineering Department, North Midland District), has been awarded the Distinguished Conduct Medal.

Sapper B. T. WORFOLK, Royal Engineers, Signal Service (S.C. & T., Leeds), has been mentioned in despatches.

Sapper H. H. BAXTER, Royal Engineers, Signal Service (Skilled Workman, Class II, Engineering Department, North Eastern District), has been mentioned in despatches.

Corporal COLLINGBOURNE, Royal Engineers, Signal Service (Unestablished Skilled Workman, Engineering Department, North Eastern District), has been mentioned in despatches.

Corporal S. DORAN, Royal Engineers, Signal Service (Telegraphist, Central Telegraph Office), has been awarded the "Croix de Guerre" (French).

Second Corporal E. J. SAMUEL, Royal Engineers (Telegraphist, Central Telegraph Office), has been mentioned in despatches.

Serjeant H. G. McCONNELL, Royal Engineers, Signal Service, (S.C. & T., Leeds), has been mentioned in despatches.

Serjeant J. F. RYAN, Royal Engineers, Signal Service (Unestablished Skilled Workman, Engineering Department, S.W. District), has been mentioned in despatches and awarded the "Médaille Militaire" (French).

Private J. MORRIS, Royal Army Medical Corps (Labourer, Engineering Department, South Lancashire District), has been mentioned in despatches.

Serjeant H. J. SAUNDERS, Highland Light Infantry (Cleaner, London Telephone Service), has been awarded the "Croix de Guerre" (French).

Serjeant R. H. SMITH, Royal Engineers, Signal Service (Telegraphist, Central Telegraph Office), has been awarded the "Médaille Militaire" (French).

Captain WILLIAM MAJOR BATCHELOR entered the service of the Post Office as a Telegraphist in the C.T.O., London, in November 1885. After spending seven years at the C.T.O., he was appointed Junior Clerk in the Metropolitan Engineering District, and seven years later secured a Second Class Engineership in the South Midland District at Birmingham. In November 1906 he was raised to the rank of First Class Engineer and transferred to the Metropolitan South District. Three months after the outbreak of war, he accepted a commission, with the rank of Captain, in the Royal Engineers Signal Service, and left on Oct. 7, 1914, for France. As a Signal Master, he has held important positions since he first took up his military duties, being for a considerable time at General Headquarters, where in addition to the supervision of office routine, he also had under his supervision the motor despatch work. For a short period prior to the battle of Loos, Captain Batchelor was selected to perform important electrical experiments in the front line trenches. He has been twice mentioned in despatches and has been awarded the Military Cross.



CAPTAIN WILLIAM MAJOR BATCHELOR.

WAR—THE TELEPHONE AND THE TELEPHONISTS.

BY ADA E. CARPENTER (*London Telephone Service*).

WAR—What a multitude of thoughts and forebodings flash through one's mind, and what mental pictures are conjured up at the sound of this tragic word. It was at midnight on Aug. 4, 1914, when this dreaded word sounded throughout our country, and since then it has left its mark on each one of us. For the first two or three days following the proclamation of war telephone traffic increased. Everybody was anxious. Some had fears that provisions would run short and made haste to prepare against such a contingency. Then, there was the rush on the Banks by people endeavouring to withdraw their money. Generally speaking most businesses increased and the traffic of the Telephone Service became much heavier. But, as after a storm there comes a calm, so is it with the Telephone Service. After the first excitement was over the traffic curves, owing to various causes, dropped considerably.

Among the mass of telephone subscribers were many of enemy nationality, and at the outbreak of war their businesses were in many cases very much injured or even shattered altogether. Many of our imports came from Germany, and the suddenness with which the war came upon the nation resulted in a great demand for home produce, thus causing prices to rise abnormally. Some businesses slackened and certain employees have received less wages. These seek to economise by reducing their expenses. To some people the telephone is a luxury, and at this time is consequently dispensed with. To others it is a necessity, but owing to business failure it has to be given up. Then there are those who are economising and use their instruments as little as possible. Therefore, when we come to consider all these points, it is no surprise to us to see the gradual downward trend of our traffic curves.

Subscribers, I think you will agree, have been more reasonable of late. Is it not a case of a great trial making our everyday troubles appear trivial, and of a greater trouble overshadowing little irritations. Or it may be that as the trouble is common to us all, it has made us more considerate towards one another, and although we may not be blind to each other's weaknesses we make excuses for them.

Thus we see something of the effect of the war on the Telephone Service. Now we will endeavour to see what good can come to our Service from the war. As in the autumn the ground is cleared and made ready for the busy time of spring, so we can use this slack period as a time for clearing. Can we not seize the opportunity afforded by the reduced volume of traffic to clear away some of the weak points of the Service.

Let us now turn to the human element in the Telephone Service. How has the war affected us? Has it made us more sober, more thoughtful and more earnest? When we consider how well recruiting is going on in our midst, and with what earnestness and determination so many of our men are volunteering, and perhaps sacrificing their lives because they are determined to stand up for what is right, is it not possible that we too have become animated with the same spirit, although perhaps unconsciously, and that the spirit is reflected in our lives and in our dealings with subscribers?

Recruiting, however, has not stopped at the men. Volunteers have been asked to take the place of male night operators absent on military duties, and many telephonists have responded to the call.

How very strange it seemed to those of us who undertook this work. At Regent Exchange there were fifteen part-time male operators on duty until 11 p.m. When they departed, the lights were lowered, and only women were left in the exchange. It seemed so strange going up to the test room at the top of the building to read registers at midnight. Gerrard and Regent Exchanges are in the same building, so arrangements were made for the Regent and Gerrard supervisors to meet on the stairs and go up together. This being done, we returned to our respective exchanges. We

had three rest periods, viz., from 12 midnight until 2 a.m., 2 a.m. to 4 a.m. and 4 a.m. to 6 a.m., or if the staff was less on one night, we endeavoured to make two rest times, from 1 a.m. to 3 a.m. and 3 a.m. to 5 a.m. No one seemed very desirous of taking the first period, and I am not surprised. I wondered when the night really did begin, for whistles were blowing and motor cars rushing past until well into the early hours of the morning.

Once I had just laid myself down to rest, feeling oh so very tired, when two people very kindly started a conversation in a foreign language under the window. They did not speak very quietly, and had I understood the language, I might possibly have felt more kindly disposed towards them. Well, after they had finished, I tried to compose myself to sleep, but no, it was not to be. Someone, I imagine, had come home very late, and apparently had been shut out, hence a banging and knocking on the door. I do not know if their efforts were effective in arousing the right people, but they certainly succeeded in waking others.

At the end of the two hours I was glad to get up and I felt more sleepy than when I first retired.

After rest there were the particulars regarding the testing to be entered up. This took some time and at 5.15 a.m. we started breakfasts. I was always ready for mine and I was surprised to find how hungry I became. The cooking was quite a business and the half hour was not a bit too long. As soon as daylight dawned we drew up the blinds and ventilated the exchange. At six o'clock the cleaners began to arrive. There were no less than four to tidy up the exchange, but the appearance when they had finished well repaid their efforts.

At eight o'clock what joy; we were off duty. Then a rush for the train and off home and to bed.

The first day on arriving home I had breakfast and went to bed, and knew no more until a voice awakened me saying that it was time to prepare to go on duty again.

Yes, I really think that those of us who have done, and are doing night duty feel that we, in our turn, are doing our bit, but what a little bit it seems when compared with the sacrifices of our splendid manhood.

If anyone had suggested in January 1914 that we should be doing night duty in 1915, we really should hardly have believed them. This is another effect of the war on the Telephone Service.

The telephonist is playing a larger part in the safeguarding of our country, as our President has previously remarked at these meetings, than the public are possibly aware.

One Sunday I was on duty and everything was quite serene on leaving at 8 p.m. I went home, and later to bed. Presently I heard something about telephone. Was I dreaming or was it really true? Yes it was true. I was required on the telephone at a house opposite. I realised what it meant, and like lightning I dressed and was across the road. Twenty-five per cent. of the staff were required on duty, and did I know what to do? Yes, I knew, and the next moment my bicycle lamp was lit and I was ready. Just for the moment my heart failed me. How quiet and dark it was, and I knew not how near those Zeppelins were. But only for the moment. I cast those thoughts aside and mounted my bicycle and peddled as hard as I could. On reaching the first house at which I was to call a colleague I banged on the door. Almost immediately up went the bedroom window and a head popped out wanting to know who was there. I explained my errand and went on to the next house. My knocking was soon answered and I passed on to the third. Here I did not receive such prompt attention. I knocked and rang and knocked and rang, but got no response. At last I heard footsteps and after a great deal of unbolting the door was opened. There in front of me stood a young man, partly dressed, holding the door open with one hand, and having a candle in the other. He looked very surprised at seeing me on the doorstep. I realised my mistake. In the dark I had come to the wrong house. I therefore apologised as best I could and was answered in a very reassuring tone that it did not matter in the least, and that I should find the young lady I required next door. I therefore delivered the message at the next house and then scorching to the exchange. It was so dark that the roads assumed an unusual appearance.

The exchange was reached at 12.30 a.m. and the total time from the receipt of the telephone message to the arrival at the exchange was not more than 35 minutes. By 1 a.m. all the emergency staff had arrived, but no Zeppelins, I am glad to say. At 2 a.m. we were told that we might return home, but as the hour was not a very inviting one in which to walk the streets, and preferring not to arouse those at home again, we decided to wait until daybreak.

After partaking of some light refreshment we settled down for the night. Some with easy chairs and some on the tables, while two others preferred to crouch in the cloakroom and watch for any intruders. At last the light was put out, but the voices were still heard in the cloakroom. All silence for a few minutes, then a voice was heard to say, "I have not got any sheet." What bliss! No chance of resting here, and so, as soon as day broke I went home. Thus ends another incident, which would not have been experienced but for the war.

On Oct. 13, however, we did really have the Zeppelins. I was late duty on this never-to-be-forgotten day. Just before 8 p.m. instructions were received for part of the staff to remain on duty. So upstairs we went and thinking it wise to be prepared if a raid did take place, partook of toast and tea. We had just finished when we were summoned to the exchange. In a few minutes the boards seemed alight, especially the incoming positions, and right well did the telephonists cope with the work. During this time several telephonists rang up and stated that they could see bombs dropping and should they come to the exchange. Instructions had been received not to draw any more staff on duty, but later those that rang up I told to come as the traffic seemed to warrant more assistance.

Soon after this the exchange manager and a supervisor came on duty and everything became normal again. It was now 11 p.m. and some of the staff including myself were sent off duty.

What a lovely night, I thought, as I cycled home, and yet I hurried instinctively. I was about three doors from home when I heard a whizzing sound. I realised what it was and could not look up, but instead of remaining on my bicycle I jumped off and ran with it along the path, left it outside and banged on the door, when bang went something else. The first bomb had dropped. The rest you all know.

Soon after one of the telephonists (whom I think very courageous) called to enquire if I was going on duty, so escorted by my brother, we came down to the exchange. What a different sight to that of an hour and a half before. People everywhere, and the broken glass in the roads was terrible. Our services were not required, so we returned home again, but we did not feel like sleep after so much excitement.

I have tried to show something of what the telephone and the telephonist are doing in this great crisis, and when peace once more reigns in our midst, I think that we shall be entitled to say that telephony has taken a very real part in this war.

ZEPPELIN RAID WARNINGS.

BY AN EXPERT.

(Reprinted from the *Daily Express*.)

THE public have been asked in a very pathetic official plea to keep off the telephone when Zeppelins are about, because the wires are wanted for the transmission of warnings to various parts of the country, and delay ensues unless the wires are kept clear for official messages.

It seems to me that the responsible authorities are making a great fuss about the public use of the telephone, and that they merely want to shift the blame for all the muddle and delay on the occasion of the last Zeppelin raid to shoulders other than their own.

As a matter of fact there is usually too much falling over each other in official circles whenever a raid is reported, and that is the real cause of the delay in giving warnings. What is wanted is organisation. The telephone must be used, but why has the telegraph service so far been entirely ignored, although hundreds of circuits and operators are obtainable? The plan I recommend is:—

1. That every coast town on the East and South Coasts should be responsible for sending information of a raid to a large inland town.
2. That half the warnings should be transmitted by telephone and half by telegraph, with priority.

3. That all officials should work together: (a) postmaster, (b) military and (c) navy authorities, (d) R.N.A.S. stations, (e) chief special constables, and (f) police.

HOW TO AVOID DELAY.

As to suggestion (1) it seems to me that a great deal of unnecessary delay would be avoided if each coast town advised one town about ten miles distant by telephone, a second town twenty miles inland by telegraph, and further a large inland town which could retransmit to other towns. The coast towns would of course communicate with each other in the usual way.

If, for example, a Zeppelin was reported five miles north of Yarmouth, the usual message would in time pass to each coast town north and south. In addition, however, Hull would telegraph the warning to Bradford, Grimsby to Sheffield, King's Lynn to Derby, Yarmouth to Leicester. Southwold to Birmingham, Aldeburgh to Northampton, Felixstowe to Hitchin, Clacton to Hertford, and so on.

In turn, with a view to avoid blocking and overlapping, these towns would telephone to a few other towns and villages, and telegraph to others. This would ensure that every Post Office telegraphist and telephonist was being employed. It is quite possible for a telegraph instrument to be superimposed on a telephone circuit, which means that emergency lines could be used at a moment's notice in every coast town from Southampton to the north of Scotland.

Anyone who has even a slight knowledge of a business house switchboard knows that great difficulty is experienced when every branch of the firm wants to telephone at once, and as the Zeppelin scares are mostly at night a restricted staff in telephone centres is the rule rather than the exception, whereas in telegraph offices the Wheatstone and other rapid working telegraph circuits are waiting for work and could soon dispose of it.

NO NEWS.

An extraordinary circumstance is that at present, when Zeppelins, after attacking an inland town, apparently turn back toward the coast, *no news is sent by the inland town to the coast*. If the military at, say, Derby wired to a coast town advising the Zeppelins' return, it would be possible for a fleet of aircraft to cover twenty miles of the East Coast and attack them on the homeward way, as each coast station would circulate the information freely. Allowing a telegram twenty minutes to come from Derby to the East Coast, and taking the speed of the Zeppelins at sixty miles an hour, a large margin would be left for our airmen to go up and meet them.

There is a stupid idea among all Government officials that notice of air raids is "secret." Codes must be used, and everyone kept in ignorance. If a postmaster, for instance, hears that there is a Zeppelin approaching, he must not warn the other offices with circuits running into his office! He should be allowed, and even given, information which he could circulate to a certain number of officials, military, police, fire stations, and all other post offices in his area.

A certain little seaside village is said to owe the fact of its not being bombed to the common sense of the grocer-postmaster, who, when he hears of the danger, just says these words to the officer commanding the troops and the police: "The lights in the village are too bright to-night." Nothing more is said, but silently the village becomes dark. Yet that postmaster would be dismissed if the Postal authorities knew that he had been instrumental in saving the village from bombing.

LONDON TELEPHONE SERVICE NOTES.

THE P.O. Telephone and Telegraph Society arranged for an extra meeting in February, when Mr. Gunton, the Principal Power Engineer, read a paper which has already appeared in the pages of this journal. It has always been recognised that the busiest men have the most time—had it been otherwise one might have been surprised that one who fills the office of Commandant of the P.O. E.V.T.C. should have found the opportunity of preparing so exhaustive a survey of the *post-War* policy in relation to labour and time-saving devices. It is difficult to make up one's mind whether one should be pleased or sorry that the prospect in telephone exchanges for such devices is, in the lecturer's view, so restricted in character. The other paper given before the T. and T. Society was read by Mr. A. B. Hart, of the Engineer-in-Chief's Office, and dealt with a subject on which Mr. Hart speaks as an expert—the loading of telephone cables. It is unfortunate that atrocious weather superposed on general war conditions reduced the audience to such narrow limits, but Mr. Hart's essay will reach a wider circle through the columns of this journal.

The London Telephonists' Society, which is not to be outdone in anything, had arranged a second meeting also in February, although it only just succeeded in getting the second gathering into that unduly extended month. The first meeting was devoted to the reading of some excellent competition papers, Miss Flanagan's description of a "Fire Drill" was full of subtle humour and greatly

to the liking of her audience. The other two papers dealt with the Telephone Service as affected by the present state of war—Miss Carpenter's account of a "Zeppelin" night being most realistic in its recital of what happened "Somewhere in England" on the occasion of a visit from certain of these unpleasant visitors. As everyone knows *telephonists* may be driven to but are not to be driven from their exchanges by these "birds of ill omen." On Feb. 29 Miss Florence Minter continued by special request the description of Constantinople—its peoples and its telephones, which she commenced at the Institute of Electrical Engineers in December last. On this occasion those present in addition to the pleasures of Miss Minter's lecture, illustrated by a wealth of beautiful slides, were favoured with a number of selections by the newly formed L.T.S. Orchestra.

The association of pictures and music carries one irresistibly to the sphere of what the Americans are pleased to call "movies," and we hear rumours that the Telephone Service is now advertised on the other side by an enthralling drama (comedy or tragedy not specified) entitled "The Modern Seven-Leagued Boots." If present plans mature London is to be similarly inflicted and is to have a telephone picture play of its own. All sides of telephone work are, we understand, to be presented and represented. An irresponsible, on hearing of the project is stated to have expressed the earnest hope that at least one scene would be given up to the exchange manager's monthly meeting, as that must be perforce a *moving picture*. It will be found, no doubt, that the heroine has just been promoted to the grade of Supervisor, Class 1, and is permitted for the first time to take part in the deliberations of this exclusive assembly. The scene is preceded by an exhibition on the screen of a report of the supervisor's capabilities, showing the precise proportion in which she possesses each one of those virtues, the aggregation of which has justified her promotion. After all we have much to suffer in the Telephone Service and provided we are not persecuted to the point of exhibitions of the great "Charlie" as a night operator we must be content to suffer in silence.

Passing from "movies" and other shows we are brought back to the stern realities of the war by news recently received in Queen Victoria Street. The London Telephone Service, as we have often pointed out, has sent a goodly muster to His Majesty's Forces, and not a few both of the clerical and male operating staffs having fought a good fight have passed to other spheres. It is not possible in a Service of the magnitude of ours for all its members to be known to one another, and whilst all in the L.T.S. extend a heartfelt sympathy to those loved ones left to mourn our heroes, each entry on the Roll of Honour makes a special appeal to those who in the past may have been permitted to direct association with him who has laid down his life for England and all that England stands for in this battle with infamy. It is this factor of personal knowledge which must explain the measure of reference in this column to those whose demise we all deplore. J. A. Bartlett was killed on March 2 as the result of a German shell exploding practically at his feet. He held the position of a Second Class Clerk in the Accounts Branch of the L.T.S., having a record of honourable service with the National Telephone Company before the transfer of its activities to the Post Office. Although deeply attached to his home and family he recognised at once the supreme importance of the present struggle and was one of the first to forsake the ranks of the P.O. E.V.T.C. for the fuller responsibilities of the Royal Engineers, with whom he has been serving in France for nearly a twelvemonth. His was an earnest kindly nature, ever interested in the well-being of others, as the writer of these Notes knows, having been privileged to work in close association with him on staff questions. Such men with their cheerful acceptance of burdens hard to be borne are an example to all of us, and it is difficult to realise the full measure of the sacrifice they have made—a sacrifice which involves so greatly their nearest and dearest.

Adapting some well-known lines of Kipling, it may be written—

"For our sakes, without question, he put from him all that he cherished;
Simply as any that serve there he served and he perished;
Much that men covet was his, and he flung it aside for us;
Simply as any have died in this conflict he died for us."

CORRESPONDENCE.

FIELD TELEGRAPHY AND TELEPHONY.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

IN the communication entitled "A Course of Instruction in Field Telegraphy and Telephony" in the February 1916 issue of the JOURNAL, Mr. Baxter appends an examination paper, and Question 5 is as follows:—

"If you failed to hear the distant station's speech in your telephone receiver, state what was likely to be wrong and how you could obtain his message."

As one who takes an interest in Army signalling, I am unable to satisfy myself as to the proper answer to this question, especially in regard to the last seven words, and I should be much obliged if Mr. Baxter would kindly supply a model answer.

W. H. THORNBURN.

Engineering Dept., Leeds, Feb. 23.

Mr. BAXTER sends the following reply:—

Experience showed that the men persistently forgot that when the sound of speech from the distant station was lost it was in many instances possible, even where a disconnection of the line obtained, to maintain communication by Morse signals.

As soon as speech ceased to be heard they invariably appealed to me saying that they had lost the distant station instead of immediately taking up the use of the Morse key which frequently will bridge a disconnection. In certain service cases such loss of time might prove to be serious.

These circumstances led me to introduce the question referred to by Mr. Thornburn. It is more practical than theoretical.

A satisfactory reply to the question should be as follows:—

"The line is probably disconnected, or the distant station's transmitter faulty. In either case communication can probably be maintained by Morse signals. If so, ask the distant station to examine his transmitter, hold it vertical, and where satisfied that the fault is actually a disconnected line send out men to locate and repair it."

It may be added that it was often found that men used the "Stevens" transmitters in a horizontal instead of a vertical position, which caused an apparent fault.

TRAINING TELEPHONISTS.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

THE question of training telephonists at medium-sized provincial exchanges, so ably dealt with by Miss Puttick, of Brighton, in the last issue, is a matter which would well repay time spent on its consideration by the "Powers that be." I think every traffic man will agree that, if the ordinary single-handed supervisor does her duty, she will have little time to supervise properly the training of the student telephonist. An operator in training should not be allowed to perpetuate the irregularities which creep in unless she is carefully watched. An observant youngster in an exchange readily absorbs all that is going on, and of course notes the good, bad, or indifferent working without being in a position to distinguish which is which. Thus the irregularities are passed on in spite of the rule book; the spoken word sinks more deeply than the written.

A good plan, failing the equipment of a school (and obviously this would not pay in exchanges where the staff numbered twenty or under), would be to utilise the services of the travelling supervisor, who might visit the main exchange and take the learners in hand at spare positions—the preliminary work might even be done in the retiring room if no other room is available, until the learners were fit to be placed at the positions. Diagrams similar to those in use at the schools, and photographs of the apparatus might be used with advantage, and save the supervisor at the smaller exchanges much trouble. The result would be a much higher standard of operator than the switchboard-trained officer one sees at present in the exchanges in the provinces, whose training under the present conditions is, to say the least, haphazard.

When the district staff does not include a travelling supervisor, one might with advantage be loaned from an adjacent centre. Two days preliminary training would be invaluable at the commencement after the student had become familiar with the rule book.

I fully endorse Miss Puttick's recommendation of interchanging staff. Many of the irregularities which occur in junction working are due to the operator not knowing what is happening at the "other end." The present period may perhaps not be the best for these propositions, in view of the increased cost, but a good return would be secured in the reduction of lost calls and engaged junctions, which would more than repay any expense incurred in the initial movement.

S. J. PHARO

Preston, March 10.

(Traffic Superintendent).

LABOUR AND TIME-SAVING DEVICES.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

IN your March issue you reproduced a paper entitled "Post-War Policy in relation to Labour and Time-Saving Devices," read on the Feb. 7 last before the London Telegraph and Telephone Society, by Mr. H. C. Gunton, Principal Power Engineer to the Post Office. In the section relating to such devices in letter sorting offices the author makes reference to my work in connexion with mechanical aids to sorting, which, in justice to myself, I cannot allow to pass unnoticed.

The only conclusions possible to the author's audience and your readers not acquainted with the facts of the case are that an examination of my

Gell Telegraphic Appliances Syndicate, Limited.

ON WAR OFFICE, ADMIRALTY, POST OFFICE, CROWN
AGENTS, AND OTHER COLONIAL ADMINISTRATIONS
LISTS OF CONTRACTORS.

SOLE MANUFACTURERS OF THE

GELL KEYBOARD PERFORATOR.

GELL Motor - Driven Transmitter.

GELL Motor - Driven Receiver

for Morse and Cable Wheatstone working.

Also Manufacturers of

**LANDLINE, CABLE AND WIRELESS
TELEGRAPHIC APPARATUS.**

Registered Offices:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Sardinia House, Sardinia Street, Kingsway, W.C.
Telephone: Holborn 6826.

Works:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Pine Grove Works, Tollington Park, London, N.
Telephone: North 1196. Telegrams: "Gelltas, London."

EBONITE.

TONS of **SHEET, ROD and TUBING** in London
Stock in various Qualities and numerous Sizes.

EBONITE-VULCANITE owing to its special nature,
can only be made successfully after many years of experience.

We have been manufacturing this Material for
OVER 60 YEARS.

AMERICAN HARD RUBBER CO.,

13a, FORE STREET, LONDON, E.C.

"EBONISETH, LONDON."

CENTRAL 12754

Head Office: 9-13, MERCER STREET, NEW YORK, U.S.A.

Factories: Akron, Ohio. Butler, New Jersey. College Point, New York.

Silk and Cotton-Covered H.C. Copper Wire.

Asbestos Covered Wire.

Charcoal Iron Core Wire.

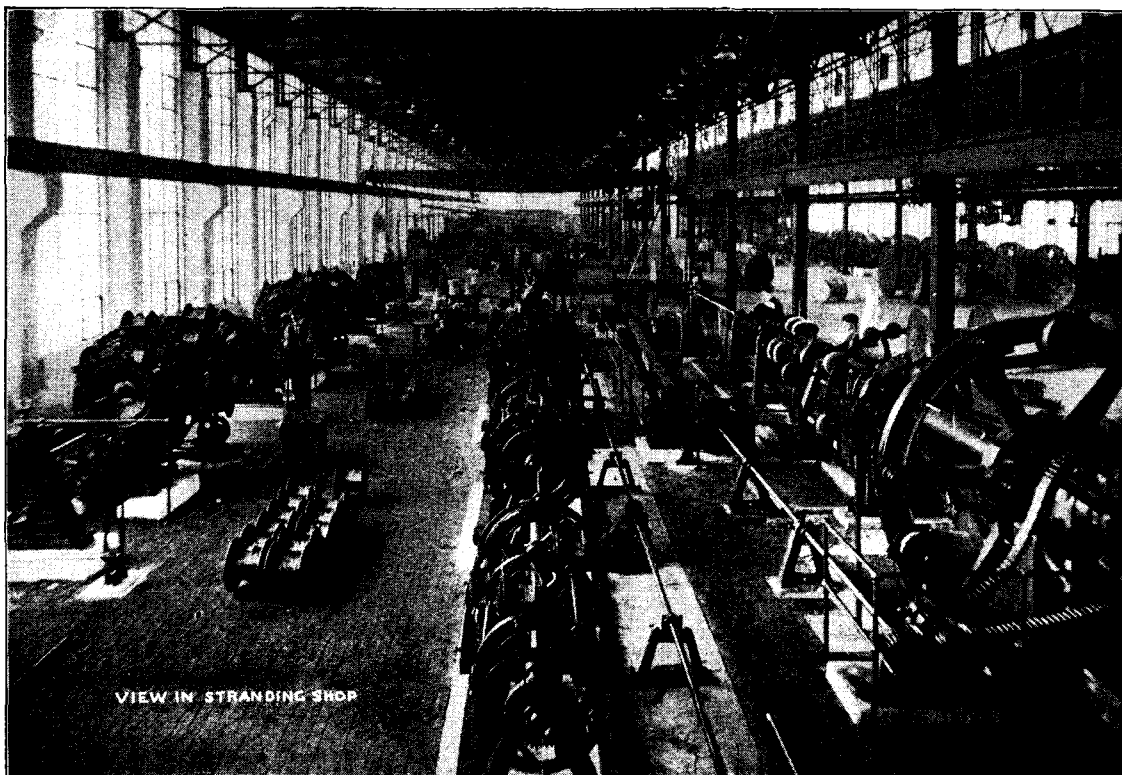
Resistance and Fuse Wires.

Binding Wires.

&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
"ORMISTON, LONDON." 13259 CENTRAL.

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital).

Telephone: 1309 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3S. 6D. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses PER PAIR
s. d.
3 6

Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames 7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE, WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

Important New Book.

Automatic Telephony

A Comprehensive Treatise on Automatic and Semi-Automatic Systems

By ARTHUR BESSEY SMITH, E.E.

Member A.I.E.E., formerly Professor of Telephone Engineering, Purdue University,

AND

WILSON LEE CAMPBELL, E.E.

Fellow A.I.E.E.

406 pages, 6 x 9, illustrated

17s. net, postpaid

See our Advertisement, January issue, page IV.

CONTENTS.

CHAPTER	CHAPTER
I.—Trunking.	IX.—Automatic District Stations.
II.—Automatic Electric Company's Switchboard Apparatus.	X.—Clement Automannual System.
III.—Subscribers' Station Equipment for Use with Automatic Electric Company's Two-Wire Systems.	XI.—The System of the Western Electric Co.
IV.—Measured Service Equipment.	XII.—Long Distance, Suburban and Rural Line Equipment.
V.—Automatic System of the American Automatic Telephone Co.	XIII.—Cutovers and Interconnections of Manual and Automatic Offices.
VI.—Siemens and Halske System.	XIV.—Power Plant, Supervisory and Testing Equipment, and Circuits.
VII.—The Lorimer System.	XV.—Traffic.
VIII.—Automatic Traffic Distributor Equipment.	XVI.—Development Studies.

HILL PUBLISHING CO., LTD.,

6 & 8, BOUVERIE STREET, LONDON, E.C.

Neverstick FILING DEVICES



The Drawers are guaranteed never to bind or stick in any climate. They have Roller Bearings and can always be opened with the little finger.

Meet the needs of all Businesses, Trades and Professions None too large and none too small. Our devices are all arranged on the Building-up System, so that you can start with sections for your requirements of to-day and add others as needs arise.

Has it ever occurred to you the amount of time that is wasted in waiting for letters or documents that have to be found when wanted, instead of being filed so that they can be had instantly?

Our "IDEAL" indexing system overcomes this waste of time.

Let us send you particulars together with our Catalogue containing 60 pages of Ideas, post free.

Write NOW whilst you think of it

SHAW-WALKER, LTD.,

33, ST. BRIDE STREET, LONDON, E.C.

THE Telephone Rendered Audible under Gunfire

BY THE USE OF

MALLOCK-ARMSTRONG Patent EAR DEFENDERS.

(MR. A. MALLOCK, F.R.S.—SIR W. G. ARMSTRONG, WHITWORTH & Co. Ltd.).

SMALL SOUNDS ARE PRESERVED.

WHEN WEARING THE DEFENDER THERE IS:—

NO TEMPORARY DEAFNESS, NO LOST TIME, NO MISUNDERSTANDING.

IT IS WORN IN COMFORT UNDER THE RECEIVER OR GAS HELMET.

CONSTRUCTED ON ACOUSTIC PRINCIPLES.

Supplied to every Ship in H.B.M. Navy.



Involves no inconvenience to the wearer.

Remove the Defenders from the Clips and place one in each ear.



In Metal Pocket Case with "Safe-find" Rubber Clips, as illustrated,

4s.

Per Pair.

Post Free,

4s. 2d. with full particulars.

Many thousands already in use in the firing line.

Indestructible.

From Stores, Outfitters and Surgical Instrument Makers, or from:—

MALLOCK-ARMSTRONG EAR DEFENDER CO.,

FACTORY: 5 CARTARET STREET, WESTMINSTER.

apparatus and proposals revealed but one useful idea, which, in a modified form, facilitated the evolution of the apparatus now under experimental trial, but that, with the sole exception mentioned, my scheme, so far as the British Post Office is concerned, is extinct. As I already hold British and certain foreign patent rights in connexion with my apparatus, an impression that my scheme has been rejected by the British Postal authorities is calculated detrimentally to affect its progress in other countries, especially having regard to the official position of the author of the paper, and I should like to state as emphatically as possible that my scheme has not been rejected, but, on the contrary, in its entirety is still under consideration at Headquarters.

The author states that an inspection of my apparatus suggested a modified method of carrying out one of my ideas which facilitated the solution of his problem. The admission, so far as it goes, represents the facts of the case, but it would hardly be gathered therefrom that the idea referred to is the vital principle on which the author's scheme depends for its very existence. Without that idea, even in its modified form, the author could not have proceeded one step with the construction of his present experimental apparatus.

The statement that my apparatus is designed for the combination of processes 4, 5 and 6 is hardly correct, and in the circumstances I should be glad of space to state briefly a few facts concerning my scheme. Its main objects are to reduce the labour of sorting, save floor space, eliminate hand clearing and collect mis-sorted letters, and it will therefore be understood that the scheme is of a more comprehensive nature than the author's reference would imply.

The primary frames are designed to admit of sorting at the back and the front at the same time, and the arrangement results in the saving of valuable floor space, as a frame for two men, each making 36 selections of letters, would occupy only 8½ square feet of floor space as compared with 28 square feet required for the accommodation of two standard primary frames, and the necessary gangway space for clearing. Each frame is independent of its neighbour and is under the control of the man using it, who can start or stop its mechanism with a touch of his hand.

Instead of the letters sorted being delivered into stackers, as must be inferred from the author's statement, the apparatus provides for their delivery on to the appropriate road sorting tables, and, where more than one man is engaged on a particular road, it provides, by means of automatic switches, for the apportionment of the work among the varying number of men required by the incidence of the work. It further provides for the automatic collection from each road table of the letters mis-sorted thereto at the primary sorting stage.

The apparatus is adaptable to any shape of room and admits of the primary and despatch sorting being done on different floors without loss of time or efficiency, as the letters sorted at the former stage could still be automatically delivered at the despatch roads wherever they may be situated.

The advantages which I have enumerated do not, by any means, exhaust the number I claim for my scheme, which I may say has received the approval of a number of London and Provincial mechanical engineers, and is built up round what I believe to be an entirely new method of sorting into narrow vertical slots, a system which enables a sorter to make many more selections of letters at the primary stage than is now possible. The standard primary frame provides for a maximum of 36 selections, whereas my apparatus makes it possible to place 90 divisions or selections within the physical reach of a man of average size, although of course it is improbable that so large a number would ever be required.

It is this, my system of vertical sorting, which constitutes that vital principle which has been modified by the author and round which the experimental apparatus has been constructed in the Engineering Department.

JNO. H. DOHERTY.

Manchester, March 14, 1916.

Mr. GUNTON writes in reply:—

In the reference to the experimental apparatus for the combined processes idea, which was not originated by Mr. Doherty, it was desired to make it quite clear that one of Mr. Doherty's ideas had been drawn upon, with full acknowledgment to him. There was no intention to suggest that Mr. Doherty's scheme was extinct.

It is thought that the brief history of the evolution of this apparatus is, as regards general perspective, as accurate and complete as possible without going into a detailed and technical description of the schemes which are at present under consideration.

March 22, 1916.

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

Transfers—

Miss E. M. HOUGH, Assistant Supervisor, Class I, on her transfer from Hampstead to the Trunk Exchange was presented by the staff with a silver chain bag, silver card case and gold brooch.

Miss H. ELLIOTT, of Sydenham Exchange, has been transferred to New Cross, and was presented with a gold pendant.

Miss E. GIBBS has been transferred from Sydenham to Hop Exchange, and was presented with a gold brooch.

Miss G. STANDEN has been transferred from Sydenham to Hop Exchange, and was presented with a gold brooch.

Resignations—

Miss H. BREDEN (Assistant Female Superintendent) has retired. She was presented with a gold pendant and chain from the F.S.O. clerical staff and others in the Service.

Miss L. WHITELEY, Assistant Supervisor, Class II, of London Wall Exchange, has resigned in view of her approaching marriage, and was presented with a quilt, cutlery and silver gifts.

Miss AGNES G. WOOD, of Mayfair Exchange, has resigned in view of her approaching marriage, and was presented with numerous gifts including cutlery.

Miss EMMA A. LUDFORD, of Mayfair Exchange, has resigned to be married, and was presented by the staff with a tea service and many other gifts from personal friends.

Miss B. E. ECCLES, of Mayfair Exchange, has resigned.

Miss A. A. WARD, of Barnet Exchange, has resigned in view of her approaching marriage, and was presented with a cruet and a tray cloth.

Miss M. GEARY, of Hampstead, has resigned, and was presented with a cameo brooch.

Miss M. NICHOLAS, of Hampstead, has resigned.

Miss GENEVIEVE W. WHITFORD, of London Wall, has resigned in order to take up hospital nursing. She was presented with a work basket by the staff in her section.

Miss DOROTHY HARRIS, of London Wall, has resigned.

Miss EDITH BARTLE, of London Wall, has resigned.

Miss GRACE L. MARCHANT, of London Wall, has resigned in view of her approaching marriage, and received many useful gifts, including a dinner service, from the staff.

Miss CONSTANCE D. LORNE (Bartholomew House) has resigned, and was presented with a clock and a hand bag.

Miss LOUISA D. THOMAS, of London Wall, has resigned, and was presented with a silver chain purse by the staff.

Miss E. PARSONS, of Avenue Exchange, has resigned in view of her approaching marriage.

Miss E. HABERFIELD, of Avenue Exchange, has resigned to be married.

Miss G. PYM, of Avenue, has resigned.

Miss G. GAMMAGE, of Avenue, has resigned.

Miss J. B. HEAVER, of Park Exchange, has resigned.

Miss C. R. STOVE, of Park, has resigned.

Miss MARY A. E. ADAMS, of East Exchange, has resigned.

Miss A. L. KING, of City Exchange, has resigned and was presented with several useful gifts by the staff.

Miss A. BRADDICK, of Hop Exchange, has resigned on account of her approaching marriage, and was presented with a dinner service and numerous other gifts.

Miss E. S. SAWDY, of Hop Exchange, has resigned, and was presented with a dinner service and several other useful gifts.

Miss B. SCOTT, of Hop, has resigned.

Miss E. DAVISON, of Hop, has resigned.

Miss E. M. TANEX, of Hop, has resigned.

Miss L. YEATES, of Hop, has resigned.

Miss A. C. CANTLAY, of Victoria, has resigned.

Miss E. BENNETT, of Victoria, has resigned.

Miss A. V. DAVIDSON, of Victoria, has resigned.

Miss V. G. VENESS, of Victoria, has resigned.

Miss A. PORTER, of Victoria, has resigned.

Miss E. S. PICKETT, of Victoria, has resigned.

Miss M. L. THOMAS, of Victoria Exchange, has resigned to be married, and was presented with cutlery and a biscuit barrel.

Miss GLADYS WILLIS, of the Trunk Exchange, has resigned in view of her approaching marriage.

Miss E. B. HANHAM, of Trunks, has resigned.

Miss G. L. TYTE, of Trunks, has resigned.

Miss E. L. ANNISON, of Trunks, has resigned.

Miss M. H. BRIGGS, of Trunks, has resigned.

Miss S. C. HOUGHAN, of New Cross Exchange, has resigned, and was presented with a morocco hand bag.

Miss N. V. MINNS, of New Cross, has resigned, and was presented with a gold brooch by the staff.

Miss L. RIVETT, of Sydenham Exchange, has resigned in view of her approaching marriage, and was presented with a cruet and other useful gifts.

PROVINCIAL STAFF.

Miss ESTHER JENKINS, Clerical Assistant (with supervising allowance), Swansea, resigned on Feb. 12, in view of her approaching marriage, and was presented by the staff with a handsome *epergne*.

Miss C. BEATTIE, of Londonderry Exchange, has resigned to be married, and has been presented by her colleagues of the Londonderry and Strabane Exchanges with a marble clock and other gifts as a mark of their esteem.

EXTRACT FROM REPORT ON THE AIR RAID AT DOVER.

The greatest credit is due to the three telephonists on duty. Miss Merralls, the supervisor, immediately the firing began, proceeded to the exchange being stopped by the police when passing the Town Hall. She protested and said she wanted to go on to the exchange. The police refused to allow her, saying the streets were in a dangerous condition. After further protest she was told she could go at her own risk; but directly she started off, they went after her and fetched her back and kept her at the police station nearly half an hour until the danger was over.

Great credit is due to Miss Merralls for wishing to take the risk when the streets were in such a dangerous condition. Shrapnel and pieces of shell were dropping all over the town.



"RED RIDING HOOD" CAST.—PADDINGTON EXCHANGE STAFF.

MISSSES M. CROFT, E. FURTWANGLER, G. ETHEREDGE, E. ATKINSON, L. CROCKETT, I. GOATLEY,
E. DALLAWAY, F. WILLIAMS, E. TOMSETT,
M. BOURNE, C. HOCKADAY, D. SPRATLEY, E. TRINDER, A. COSTER, R. STOKES, A. TOVEY,
E. LOURSEN, W. MOOR, M. BROEGGER.

PADDINGTON EXCHANGE TEA AND ENTERTAINMENT TO POOR CHILDREN.

The staff of the Paddington Exchange were "at home" to some 350 guests on the afternoon of Saturday, Feb. 12.

Owing to the established popularity of these "at homes"—for this was the fifth—and the large number of guests who possessed required qualifications of poverty and residence in the district, it was necessary to issue carefully scrutinised cards of invitation.

Quite a large crowd of these visitors waited in eager expectation for the doors of Portman Hall to open, and when they were admitted, a noisy but orderly crowd, they settled down to tea in record time. After the presentation to each of handkerchiefs and crackers, a substantial spread was enjoyed, and then followed the entertainment. This took the form of a costume representation of "Red Riding Hood," the result of absolutely unselfish work and wholehearted co-operation, and the children roared with delight at the performance. We have pleasure in reproducing a picture of the caste. When Mr. Marshall, the Master of the Ceremonies, asked for a show of hands by those whose relatives were on military service, all thought of diverting energies that might have been better employed for the welfare of the country was dispelled by the assurance that nearly all the guests were "represented."

The hour of parting was softened by the presentation of a penny and a bag of denaries to each child.

Much of the success was due as in former years to the help and kindly personality of the Master of the Ceremonies, who nobly seconded by Mrs. Marshall is devoting his life to the welfare of these children and their families.

THE TELEPHONE STAFF HOSPITAL COLLECTIONS.

(Associated with the Hospital Saturday Fund.)

The annual general meeting in connexion with the Telephone Staff Hospital Collections took place at G.P.O. South, Carter Lane, on Wednesday, Feb. 9, Miss A. A. Heap presided. The secretaries presented their reports for 1915 which showed an increase of £69 3s. 9½d. on the collections for the previous year, the total sum paid into the Hospital Saturday Fund being £778 6s. 2d. In moving the adoption of the report Miss Heap thanked the staff of the various exchanges for the splendid effort they had made during the year, which had resulted in making the collections the highest since 1911, notwithstanding the fact that so many of the male staff who were contributors had been called away.

Mr. Davis, the general secretary of the Hospital Saturday Fund, was present and congratulated the staff on the gratifying results obtained by them for the year 1915.

Miss Heap on the motion of Mr. Stirling, seconded by Miss Nurse, was unanimously re-elected chairman for the ensuing year.

POST OFFICE RELIEF FUND.

As compared with the preceding month the number of claims for assistance received during February on behalf of the dependents of Post Office men who lost their lives on active service shows a considerable increase, 50 widows and dependents and 60 orphans being added to the books. The totals are now 1,077 and 1,354 respectively.

During that month six men were added to the list of Post Office prisoners of war, but as one man was returned from Germany as unfit for further military service, the net increase was five, making a total of 577. It is of interest to record that already over 16,000 parcels have been despatched and that not a few of the acknowledgments contain, besides an appreciation of the contents of the parcels, a request that the thanks of the recipients shall be conveyed to subscribers generally.

The number of men in the Hospital and Convalescent Homes on Feb. 29 was 40. The incoming and outgoing patients during the month numbered fourteen and fifteen respectively.

Gifts in great variety continue to be received at the hospital. Among those received recently none have been more welcome than the sum of £8 10s. for comforts from the Kilburn Postman's Christmas Box Pool; the carpet slippers from the staff of the E.C. and F.S.; and the daffodils and narcissus from the Postal staff of the Scilly Isles.

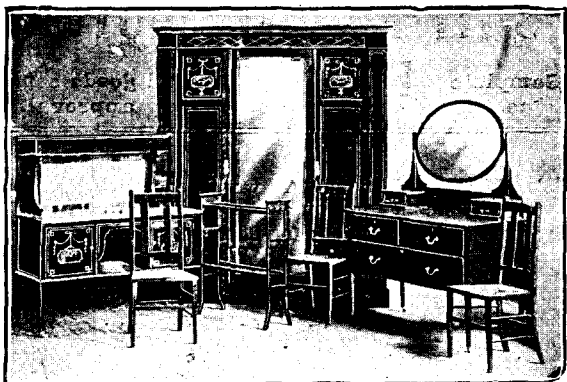
Many further contributions have been received from Fines and Gains Funds. A sacred concert at Glasgow resulted in a donation of £147. The proceeds of a whist drive organised by the staff at Warwick amounted to £8, and the Kemble Dramatic Society's performance of "The Passing of the Third Floor Back" added £30.

ENTERTAINMENT FOR SOLDIERS' WIVES AND CHILDREN, GLOUCESTER.

For the second year in succession the wives, children and dependents of Gloucester Post Office servants on active service were entertained to tea by the members of the Post Office staff, assisted by a few friends of the officials. This year's gathering, which was much larger than that of twelve months ago, took place in the Corn Exchange on March 2, when a happy family party consisting of about 70 women and 80 children sat down to an excellent tea.

Following the tea an enjoyable entertainment was given. The musical contributions included a pianoforte solo by Mr. Shaw; baritone song, Mr. W. Gunston; toe dance, Miss Marie Rose; violin solo, Miss D. Orchard; recitation, Miss Vera Phelps. Miss Lallie Hay and Mr. Tom Hay provided the humorous items, and in addition there was a Punch and Judy. At the close of the entertainment gifts were presented to the children. The arrangements for the entertainment were made by Mr. T. H. Davis of the Gloucester telegraph staff.

The Mayor and Mayoress (Sir James and Lady Bruton), the Postmaster and head officials were present during the evening.



Antique and Modern Furniture

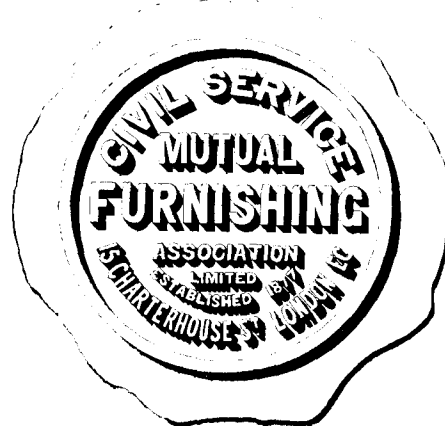
of Distinction and Durability

For CASH or EXTENDED PAYMENTS

can be obtained by

CIVIL SERVANTS

on the most advantageous terms from the



HAND PAINTED PORTRAITS IN OILS or WATER COLOURS.

On Canvas and Stretcher. 15 x 12 inches.

PRACTICALLY LIFE-SIZE.

10/-



10/-

Do not keep photos of your dear ones hidden away in albums. Have their features before you in the natural colours of life. For 10/- we supply a permanent Portrait painted in oils or water colours, on canvas and stretcher, size 15 inches by 12 inches (practically life-size), ready for framing. We are making a speciality of Army Portraits at the present time. Accurate likeness guaranteed. Send photo and full details of colour of hair, eyes, complexion, and dress.

ART PHOTOGRAPHY LTD.

(T. & T. Dept.), 47, MINORIES, LONDON, E.C.

HAVE YOU SEEN THE NEW STYLES?



Crichton's New "Book of Ideas" is now ready—all the new Spring Fashions; send a postcard, and a copy will be sent immediately.

**Why don't you open
an Account at
Crichtons'?**

You can order your New Coat and Skirt, Overcoat, Mac, or Raincoat, Furs, Fur Coats, Blouses, Underwear, Shoes, Trunks, &c., &c. on the "Times" System—quite private and confidential—
from 5/- monthly.

A postcard sent off to-night and full details will reach you by return.

Special Terms
to Telephone and
Post Office Staff.



CRICHTONS' LTD.

Ladies' Tailors, Furriers and Outfitters,
14, CRICHTON HOUSE, DEVONSHIRE SQUARE, LONDON, E.C.
(One minute from Liverpool Street Station).

BOOKS ON TELEGRAPHY AND TELEPHONY

AUTOMATIC TELEPHONY. A clear description of the Strowger Automatic Telephone System as adopted by the G.P.O. By S. TURNER, E.-in-C.'s Office. 32 pp., illustrated. 7d. net, post free.

TELEPHONE TROUBLES, AND HOW TO FIND THEM. On both the Magneto and O.B. Systems. Sixteenth Edition. 7d. net, post free.

HANDBOOK FOR WIRELESS & INLAND TELEGRAPH OPERATORS. By CHARLES WARD. A useful and practical work. 1s. 1d. net, post free.

THE HANDY ELECTRICAL DICTIONARY. By W. L. WEBER, M.E. Contains definitions of over 4,800 distinct words, terms and phrases. 1s. 1d. post free.

THE TELEGRAPHISTS' AND TELEPHONISTS' NOTE BOOK. Third Edition. Handy pocket size, $5\frac{1}{2} \times 3\frac{1}{4}$ inches, with squared pages for Memoranda, Calculations, &c. Highly spoken of by leading P.O. officials. Price 1s. 6d. net, or 1s. 7d. post free.

QUESTIONS & SOLUTIONS IN MAGNETISM & ELECTRICITY. By W. J. WHITE, M.I.E.E. Containing solutions to all questions in magnetism and electricity set by the Board of Education and the C. and G. Inst., for the years 1907-1913. Crown 8vo. Fully illustrated. Price 1s. 8d. net, post free.

THE HUGHES AND BAUDOT TELEGRAPHS. By ARTHUR CROTCH. Invaluable to students, as a knowledge of both systems is now demanded by the examiners. Cloth 8vo. 1s. 6d. net, 1s. 8d. post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY, Final Examinations, 1906-1915. By H. P. FEW, Silver Medallist, &c. Limp Cloth, 8vo., illustrated, 1s. 6d. net. 1s. 9d. post free.

TECHNICAL TELEGRAPHY. By ROBERTS and BURROWS. Fifth Edition. Contains "Hints to Students," together with an exhaustive selection of questions and model answers in all grades of the C. and G.T. and T. exams. Completely revised. 1912-13 exams. included. 2s. net, 2s. 2d. post free.

THE TELEGRAPHISTS' GUIDE. By BELL and WILSON. Absolutely the best and most up-to-date work of its kind on the market. For class teachers and students alike it is invaluable, and the repeated calls for fresh editions prove its merit. Sixteenth thousand. 2s. net, or 2s. 3d. post free.

NOTES ON TELEGRAPHY. By G. MOGG. A simple exposition of the rudiments of technical telegraphy and telephony. Specially designed to meet the requirements of the C. and G. ordinary examinations. 2s. 6d. net, 2s. 9d. post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY. By H. P. FEW. Includes model solutions to the C. and G. exams. 1904-1914, as well as to several typical questions set at the Post Office Departmental exams. for Overseerships. Fourth edition. Cloth. 230 pages, 172 illustrations. 2s. 6d. net, or 2s. 9d. post free.

GUIDE TO THE PRACTICAL ELEMENTS OF ELECTRICAL TESTING. By J. WARREN. A useful work, clearly expressed and well illustrated. 3s. 6d. post free.

PRACTICAL TELEPHONY. By JAS. BELL, A.I.E.E., and S. WILSON, A.M.I.E.E. A simple and practical handbook suitable for students, artisans, &c. Copiously illustrated. Latest edition. Twelfth thousand. 3s. 6d. net, 3s. 9d. post free.

MANUAL OF WIRELESS TELEGRAPHY. By Comdr. S. S. ROBISON, U.S.N. The standard text-book for Marconi students. Recommended by the editor of the P.O.E.E. Journal, The Electrical Review, and by all the leading teachers. Latest edition. Cloth, 8vo. 241 pp., illustrated. 8s. net, 8s. 4d. post free.

PRACTICAL TELEGRAPHY. By H. W. JENVEY, M.I.E.E., Electrical Engineer to the Postal Department, Victoria. A standard text-book specially suitable for Colonial telegraphists. Fourth edition, revised and enlarged. Cloth, 8vo. 441 pp. and 83 illustrations. 10s. 6d. net, 10s. 9d. post free.

TELEPHONY. By SAM'L G. McMEEN and KEMPSTER B. MILLER, M.E. The latest and best book published on the Theory and Practice of all phases of Telephone Work. 960 pp., 700 illustrations. 17s. net.

STANDARD TELEPHONE CONSTRUCTION METHODS. By FRANK B. HALL. This book contains 250 full-page drawings of standard materials and methods of construction; 280 pages of specifications and tables. No detail from sub-station to main distributing frame omitted. Price 17s. net, post free.

Sent post free at prices stated by

S. RENTELL & CO. Ltd., 36, Maiden Lane, Strand, London.

WRITE FOR CATALOGUE NO. 36.

BOOKS AT NEXT-TO-NOTHING PRICES.

Send for Complete Catalogue.

All goods sent on approval.

Quote No.		Usual Price.	Sale Price.
1	Loisetie's Memory Manual. A world-renowned system. Invaluable in public speaking ...	£5	8/6
2	The Cyclopædia of Illustrations for Public Speakers. Edited by Robert Scott and W. C. Stiles. Entirely new and up-to-date illustrations not to be found elsewhere. 844 pp. (Prospectus on request) ...	21/-	10/6
3	How to Live. By Irving Fisher, Ph.D., and Eugene Lyman Fisk, M.D. An Authoritative Book on rules of healthful living based on Modern Science and physical possibilities ...	4/6	NET
4	Complete Guide to Public Speaking. By the World's Great Authorities upon Public Speaking, Oratory, Preaching, Platform and Pulpit Delivery, Voice Building and Management, Debate, Reading, Rhetoric, Eloquence, Expression, Gesture, Breathing, Composition, Style and Arrangement, Conversation, Personal Power, Mental Development. 700 pp., and Complete Index ...	£1	NET
5	How to Develop Power and Personality in Speaking. 8vo. 422 pp. ...	5/-	NET
6	How to Develop Self-Confidence in Speech and Manner. Addressed particularly to such as "defraud themselves by Doubt, Fear-thought, and Foolish Timidity." 8vo. 288 pp. ...	5/-	NET
7	How to Argue and Win. Suggestions for Training the Mind to Accuracy of Thought and in the Power of Clear and Effective Statements. 8vo. 310 pp. ...	5/-	NET
8	Essentials of English Speech and Literature. An outline of the origin and growth of the English language. By Frank H. Vizetelly. 408 pp. ...	6/-	NET
9	The New Desk Standard Dictionary. A comprehensive abridgment, specially suited for office and study, of the famous Standard Dictionary of the English Language, and containing its many distinctive features. Magnificently illustrated, with 1,200 pictures, diagrams, and maps. There are 80,000 defined words and terms, 6,000 graded synonyms, full tables of antonyms, prepositions, etc. ...	7/6	NET
10	Connectives of English Speech. By James C. Fernald. Definitions, with Correct Usage of Prepositions, Conjunctions, Relative Pronouns, and Adverbs. 8vo. 324 pp. ...	6/-	NET
11	Desk Book of Errors in English. By Frank H. Vizetelly, LL.D., including Notes on Colloquialisms and Slang. Crown 8vo. 150 pp. ...	3/-	NET
12	English Compound Words and Phrases. By F. Horace Teall. A Reference List of 40,000 Word-Forms, with Compounding Principles and Rules. Demy 8vo. 311 pp. ...	10/6	NET
13	English Synonyms, and Prepositions. By J. C. Fernald. Over 7,500 Classified and Discriminated Examples of the Correct and the Accurate Use of Words. 8vo. 574 pp. ...	6/-	NET
14	Foreign Classics in English. By Prof. William Cleaver Wilkinson. Direct Translation and Skilled Commentary on the World's Ancient and Modern Classics: Greek, Latin (both preparatory and college courses), French, and German. Crown 8vo. The set, 6 vols. uniform, 36s. Per vol. ...	6/-	2/-
15	The Art of Speaking and Writing the English Language. By Sherwin A. M. Cody. A Series of Six Handy Manuals of 128 pages each, containing, in Concise and Attractive Form, the Essentials of Good English. 12mo. Set, in box ...	18/-	8/6
16	Faulty Diction. A handy little Guide to Correct Pronunciation. Deals particularly with "popular" inaccuracies ...	1/-	NET

Please send on approval books from above numbers.....
I agree to return in 5 days, or send 2/6 (as first instalment of purchase on monthly payments) within 8 days.

Name

Address

To **FUNK & WAGNALLS CO., 134, Salisbury Sq., London, E.C.**

THE Telegraph and Telephone Journal.

VOL. II.

MAY, 1916.

No. 20.

CONTENTS.

	PAGE		PAGE
TELEPHONES FOR TELEGRAMS	159	EDITORIALS—	
TELEPHONE RECORDS	160	THE POSTMASTER-GENERAL'S REPORT	168
TELEPHONE OPERATORS AND AN AIR RAID	162	TELEPHONES FOR TELEGRAMS	168
TELEGRAPHIC MEMORABILIA	163	THE ABOLITION OF ABNORMAL TELEPHONE RATES	169
REVIEWS	164	TELEPHONE TROUBLE	170
THE INTERPHONE	166	HIC ET UBIQUE	170
LONDON TELEPHONE SERVICE NOTES	167	THE CORRELATION OF PUBLIC ADMINISTRATION AND FINANCE... ..	171
		PERSONALIA	176

Subscription: To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies: To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

TELEPHONES FOR TELEGRAMS.

THE OTHER ASPECT OF THE CASE.

It is hardly a matter for surprise that the usefulness of the telephone for the transmission of telegrams should be appreciated so suddenly. The various articles which have appeared in the TELEGRAPH AND TELEPHONE JOURNAL arguing in favour of a considerable extension of telephoning are indicative not of a new discovery so much as a new and extended appreciation of an old discovery. In fact the original application of the telephone was to the transmission of written messages, and the connexion of members of the public for direct speech with each other was a later development. There is now quite a considerable body of thought in telegraph circles which has come to regard a revolution of telegraph practice as inevitable, and to see a day coming when there will only be a small number of telegraph centres in the country, each of them, by means of radiating telephone lines, serving a considerable district. This vista has been opened before us by enthusiasts who show not only great ability but considerable force of imagination in conjuring up the idea of a telegraph service very different from that to which we have grown accustomed. Let it be admitted at once that as a telegraph instrument the telephone is much more efficient than many of us supposed. Traffic loads are carried on many routes up and down the country much higher than those of us expected who have spent our lives in telegraphy. But when this is admitted the case is not made out for such an extension of telephoning as many writers have urged.

To begin with, outdoor telephone plant is more costly than the single wire which is sufficient for telegraph purposes. It may be the case where there is a telephone cable that enough pairs for telegraph purposes are available in consequence of the fact that the telephone development schemes necessarily look ahead. But if a general intercommunication scheme were adopted it would involve the equipment of telephone circuits for telegrams whether or not such circuits were available in telephone cables, and this would cause a considerable outlay. In certain cases where telephone lines happen to be available there is everything to be said in war-time for using them for telegrams, and a good deal to be said for switching subscribers through to a larger centre for

phonogram services, but to leap from this to a general enunciation of the superiority of telephones in all cases is rather a different matter. We must not build too big a structure on the slender foundation of war-time experience, with all its complicating factors.

Nor can it be said that in the provinces the possibility of through switching is sufficient to throw the balance of argument on the telephone side. However much we may regret the fact, there is very little local or quasi-local traffic. A special tariff might conceivably create that traffic, but the signs are not favourable to a special tariff. The great bulk of traffic is from one district to another district, and it follows that—outside London—intercommunication is not of such importance as it might seem to be to those who view the question from the point of view of telephone analogy. A duplex Morse, old-fashioned as it may seem to be, is a highly efficient telegraph apparatus, and with such plant between the centre and each of the surrounding towns of any considerable size the traffic flows so evenly that probably a better result is obtained for telegraph traffic as a whole than with any system of telephoning which would call for switchings for, say, 10 per cent. of the traffic.

Mr. Davis, in his remarkable paper, suggested the use of typewriters with telephones. Herein he showed prescience, though the practicability of using typewriters with telephones is not yet established. But he showed prescience in realising that the weak spot with telephones is handwriting. It may be that we are near to the development of printing telegraphs, cheap in construction, though calling for skill in management and in efficient working, which can be dovetailed—by punched slip or by other means—with the high-speed printing on main routes. At least there are those among us who believe that this rather than the telephone is the direction in which progress will lie.

There can be no doubt that for sub-offices where a telephone call office does not fill the line, there is a strong case for using the same pair of wires for telegraph also. The later doctrine of call offices is that they are of educational value in the utility of the telephone. Hence they are not established because there is a demand but because there is not a demand, and there ought to be a demand. Such a call office may only teach one person a day the usefulness of a telephone; if it does so it is remunerative, or at least it will be remunerative when the happy days come in which again we shall be anxious to extend the number of telephone subscribers. Such

call offices, at small sub-offices, obviously can carry the telegraph traffic and they are welcomed by the sub-postmasters. But this seems to be the proper range of the use of the telephone for telegrams. When long junctions and even trunks are used it is a very different question.

It may be possible that the true method will strike a middle line between the dreams of the telephone enthusiasts and the older ideas of uniform Morse. Telegraph working will be continued, but the telephone organism will be used for those telegrams where transmissions will be saved. There will not be a sweeping change such as that indicated—very cleverly, indeed—in the last number of the JOURNAL whereby a whole district of Yorkshire was suddenly changed from a network of telegraphs to a network of telephones. The use of the telephone seems most likely to be an auxiliary to the use of telegraph instruments, not substituting it but supplementing it, and enabling the telegraphs to serve outlying districts which have always been difficult to serve remuneratively, the telephone circuit in these cases being secondarily a telegraph circuit and primarily a portion of telephone missionary work. If it happens, too, that superposition on local circuits is developed and automatic clearing can be continued, the case for the retention of telegraph instruments will be even stronger. Obviously, if the pair of wires can be used simultaneously for telegraphs and for telephones there is a decided advantage over the method of speech both for calls and for telegrams. We are only at the beginning of these developments, and changes which have been necessary in war time should not lead us too hastily to imagine the telegraph system of the future.

F. B. G.

TELEPHONE RECORDS.

I.—THE FIRST INTRODUCTION OF THE TELEPHONE TO THE BRITISH POST OFFICE.

THE account of the invention and development of the telephone given in Mr. J. E. Kingsbury's book *The Telephone and Telephone Exchanges* suggested the possibility of finding something of interest in the Post Office records as to the impression made by the new discovery on our official ancestors.

The telephone was at first supposed to be an appliance for multiple telegraphy, as is shown by the following correspondence between Mr. Patey, the Third Secretary to the Post Office in charge of Telegraphs, and Mr. Culley, the Engineer-in-Chief. The secretarial minute is in the handwriting of Mr. J. Ardron. It seems to be the first mention of the telephone in the official papers of the Department.

Mr. Culley,

As mention is not unfrequently made of the telephone as an instrument capable of sending several messages simultaneously and giving higher results than are obtainable from any other instrument, the Secretary desires to have a report from Mr. Culley as to its capabilities and practical utility.

C. G. B. P.

The Secretary,

March 1, 1877.

I am not aware that any form of this apparatus is actually used in practice. The most attention has been given to it in America, and when Mr. Preece and Mr. Fischer visit the United States this spring they might enquire into it. I have not seen it nor am I aware that there is an apparatus in this country. I can therefore give no report on it.

Varley patented something of the kind but it has never been publicly tried. It has been (the principle) experimented on in Sweden also as well as in America.

Several messages have been sent at one time, but very slowly, I think.

The principle is this. It is well known that a tuning fork of a certain pitch gives a definite number of vibrations per second. The higher the note the more vibrations.

It is also well known that when a number of different forks are exposed to the influence of vibrations—however caused—the fork whose pitch corresponds to the rapidity of such vibrations will sound, and none other.

If then a fork, say of C pitch, be so arranged as to form a contact maker of an electrical circuit which has an electro-magnet at the other, or distant end, this magnet will be attracted and repelled as many times a second as the C fork vibrates and if set on a proper sounding board together with another fork exactly alike in pitch, will cause it to sound.

Further if forks sounding other notes be set on the same sounding board, only the one in tune with the C will be affected.

Next, forks of A, F, E, or any other notes may be placed in circuit on the same wire at the sending end, with their respective magnets, and so on at the receiving end. The wire will convey all these vibrations without interference and the Morse code can be signalled. One clerk will, we may say, work or send on the C fork—this will influence the distant C, and no other. Another clerk will send on the A. His message will sound in Morse code at the pitch of A, and so on for the rest.

But if the forks are not exactly in tune all goes wrong. The system is very pretty but must be very delicate.

This explanation is but rough, yet I hope it may convey an idea of the system and may show that in rough hands it is hardly likely to give greater results than any other instrument.

R. S. CULLEY,

March 3, 1877.

On Sept. 29, 1877, Col. Reynolds, Professor Graham Bell's agent in England, offered to show the "telephone" to the British Government "with a view to its adoption as a part of the telegraphic system of the country."

The Engineer-in-Chief thereupon reported—

"It is quite unnecessary to accede to his proposal for showing the invention, as we are ourselves fully acquainted with its details.

"I may observe that in its present stage the possible use of the telephone appears to me even more limited than I at first supposed it. In Newcastle, Leeds and Belfast, there is not a single wire held by a private renter on which the telephone could be used. In Liverpool, Glasgow and Manchester, all large centres of private wires, there are but nine altogether on which the new instrument would be available.

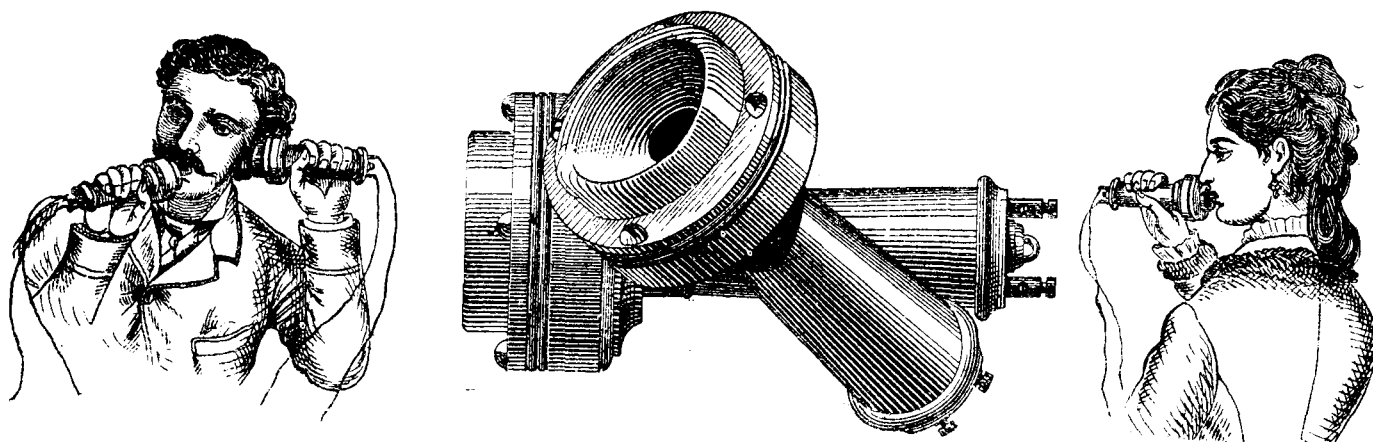
"This arises from the necessity of providing for the telephone a wholly separate and distinct course. In many towns such separate course or wire could not be provided as the local authorities will not permit the erection of overhead lines."

In the same month, October 1877, Messrs. Fischer and Preece handed in their long and able report on the American telephone system, the result of their visit to that country earlier in the year. Their reference to the telephone is as follows:—

M.—THE TELEPHONE.

In no branch of telegraphy have greater strides been made in America than in the establishment of what has been called telephony. The word telephone has been applied indiscriminately to instruments employed in the production of sounds and of music, and to those which repeat the articulations of the human voice. A distinction ought to be drawn between the two, and some such terms as *tone-telegrams* should be applied to the one and *articulating telephone* to that apparatus that repeats human speech—we give in the appendix a full description of this apparatus.

Bell's telephone is in practical use in Boston, Providence and New York. There are several private lines upon which it is used in Boston and several more are under construction. We tried two of them, and, though we succeeded in conversing, the result was not so satisfactory as experiment led us to anticipate. This was due to induction from working wires. There is no doubt that the interference of working



WOOD BLOCK ILLU.

AS ISSUED BY THE POST OFFICE.

wires will seriously retard the employment of this apparatus, but scientific enquiry and patient skill will probably eliminate all practical defects.

At present, however, it cannot be said that the apparatus is in such a form as to be of practical value to the Department, and, beyond suggesting that encouragement be given to its examination and trial we cannot recommend that any steps be taken to secure its use.

As the result of negotiations, Col. Reynolds agreed in December 1877 to supply the Post Office with telephones for use on the Department's private wires at a discount of 40 per cent. off the rates offered to the public in the circular, a copy of which follows:—

(The block reproduced above was at the head of the circular.)

THE TELEPHONE.

The articulating or speaking telephone of Professor Alexander Graham Bell has now reached a point of simplicity, perfection and reliability such as give it undoubted pre-eminence over all other means for telegraphic communication. Its employment necessitates no skilled labour, no technical education, and no special attention on the part of any one individual. Persons using it can converse miles apart, in precisely the same manner as though they were in the same room. It needs but a wire between the two points of communication, though ten or twenty miles apart, with a telephone or a pair of telephones—one to receive,

the other to transmit, the sound of the voice—to hold communication in any language. It conveys the quality of the voice so that the person speaking can be recognised at the other end of the line. It can be used for any purpose and in any position—for mines, marine exploration, military evolutions, and numerous other purposes other than the hitherto recognised field for telegraphy; between the manufacturer's office and his factory; between all large commercial houses and their branches; between central and branch banks; in shipbuilding yards, and factories of every description; in fact, wherever conversation is required between the principal and his agents or employes, or between the superintendent and his leading men, there the telephone will find place and employment. Ordinarily it may be regarded as a speaking tube attended with all the advantages of telegraphic communication.

TERMS.

	Purchase.		Rental per ann.
	£ s. d.		£ s. d.
For a set of instruments for short circuits ...	25 0 0	or	5 0 0
For a set of instruments for long circuits ...	35 0 0	„	10 0 0

Each set of instruments consists of a pair of telephones and a call bell—the equipment for one end of a communication.

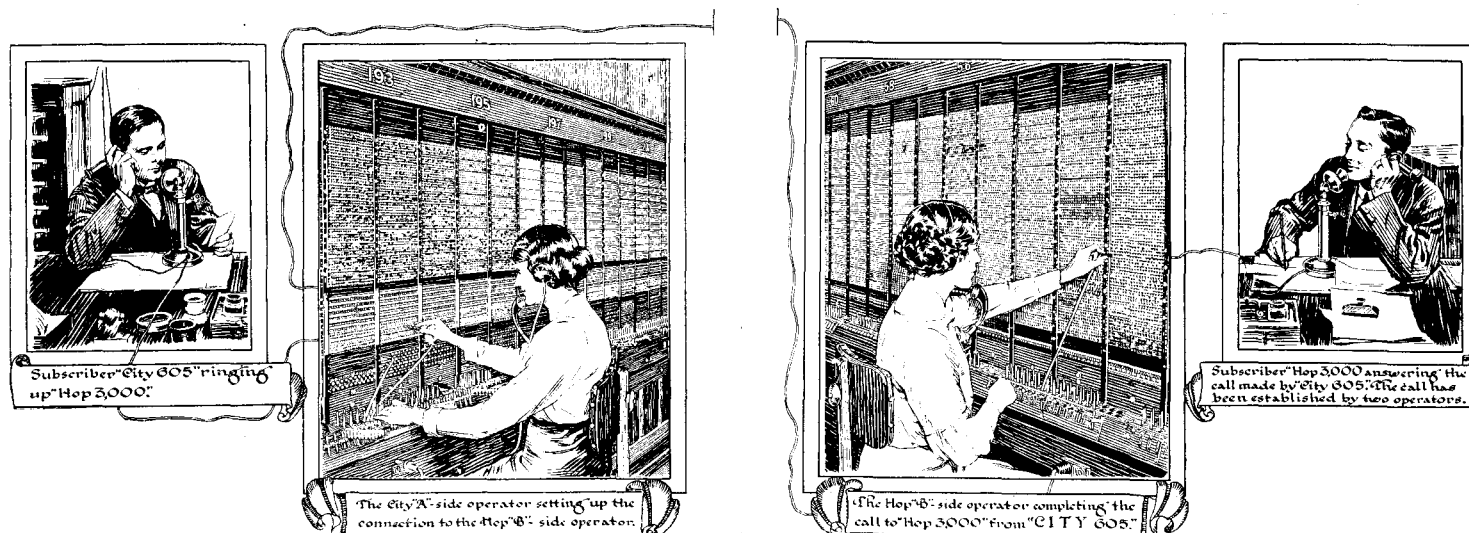


ILLUSTRATION FROM THE LATEST BOOKLET ISSUED BY THE POST OFFICE ON TELEPHONES.

Where required for domestic purposes, hotel, factory, or other indoor uses, special rates will be quoted on application, stating the purposes for which the apparatus is required, with the distance between the points of communication.

A simple form of agreement which those employing the instrument will be required to sign will be provided. In cases of rental this agreement will be determinable at three months' notice, or, failing such notice, on the payment of such sum as the agency may agree to accept in lieu thereof. The rental is in all cases payable in advance. The purchase-money paid for any set of instruments secures a licence to use them only for the purposes specified within the licence. The rental charge covers the cost of maintenance of the instruments hired. In either case the amounts specified cover all royalty charges.

TELEPHONE OPERATORS AND AN AIR RAID.

THE bomb-shell burst early in the evening with news of cessation of train traffic. Almost immediately afterwards came the order that operators were to remain at their positions until further notice. A whisper of "Zeppelins" went round the switch-room. Sinister confirmation was afforded by the spectacle of an assistant supervisor switching off all lights not absolutely necessary with commendable energy and enterprise. An emergency or volunteer operator, the sole representative of his class present, was "listening in," somewhat listlessly, at a special position when the news arrived. He had been under training for a lengthy period. The experience was interesting, but he was beginning to wish for some slight variation from the usual routine. It was true that his own operating was an appreciable variation from that usually practised, and he had not shown slavish adherence to standard forms of expressions in his replies to subscribers. His variations from ordinary procedure were, however, in themselves so frequent and so regular as to tend towards monotony. The feeling with which he heard the news was, in the circumstances, faintly pleasurable.

The cultivation of memory is a useful pursuit, and the emergency operator wished at the moment that he had devoted more attention to it. He had read descriptions of previous raids and vaguely remembered telephone exchanges and operators entering into them, but could not recollect mention having been made of emergency operators and the responsibilities which they assumed on such occasions. The descriptions of the behaviour of the ordinary day operator had, however, left him coldly sceptical. The reports combined to show that intense coolness in the face of danger was an unvarying attribute of the telephone operator, that such occasions knew no smelling salts, that operators had even been known to yawn at repeated explosions as if bored by the monotony of repetition. Such tales invited scepticism, if not actual and active disbelief.

On the occasion under description the emergency operator, disposed towards liberal conception of his duties, approached the reigning supervisor and indicated willingness to assist in the dispensation of ministrations, instancing more particularly transmission of soporifics to hysterical operators, restoratives to sinking supervisors. Astonished, he received answer, somewhat coldly delivered, albeit with confident tone, that no such steps as he indicated would be necessary, so far at least as the female portion of the staff was concerned.

The appearance of the switchroom seemed to indicate that the supervisor's confidence was well founded. The work at all positions was proceeding as in normal times. Apart from the usual standard expressions, which were being rattled off with customary ease and brilliancy, little could be heard. The assistant supervisors moved quickly and quietly behind the operators' chairs fulfilling the duties proper to their class as described in the Service Instructions and skilfully avoiding pillar and plinth—awkwardly placed at this exchange—on their own initiative.

Monitors were at their desks taking all irregular and exceptional calls. The reigning supervisor was in her usual position in the centre of the room, calm and confident in the attitude officially prescribed. Two special constables, moreover, were, at this moment, as subsequently came to light, proceeding to the building in the manner and at the pace set forth in official regulations. All was in order and in conformity with precept and practice.

Groping to a second switchroom of the exchange the emergency operator found the same atmosphere of calm assurance. There was nothing which reflected the commotion outside. From time to time brief conferences were held by the principal officers which led to relief from duty of portions of the staff, and the grant of refreshment intervals to other portions. A larger number of operators than usual at such an advanced hour were present, but otherwise there was no indication of untoward occurrence. Clearly, too, was it apparent that the prevailing calm was not the stoicism borne of a blind or fatalistic feeling which leads to disregard of danger. Rather was it engendered by the confidence of the trained soldier who, apprehending with clearness of vision the position, and encouraged by the example of those in command, is determined to play worthily the allotted part.

The entry of the two special constables, with a stolidity of demeanour which conveyed the impression that neither would be likely to be accused of incendiarism in connexion with the River Thames, was unattended with furore. "Nothing much to do here" said one of them looking round and addressing no one in particular like a regular member of the Force in a street crowd, "I'll see how they're getting along downstairs." Accompanying him, the emergency one found—further comparison with the Regular Force is deprecated—that the refreshment buffet was the immediate objective.

The refreshment room presented an animated and cheerful spectacle, but naturally the unusual demand had led to a shortage of certain commodities. Claiming as a benevolent neutral the right to receive supplies, the emergency operator was given a mixture of coffee and condensed milk. Bread and butter, cakes, and lighter varieties of farinaceous foods in biscuit form were plentiful. Conversation was abundant and the chances of the exchange building being hit were discussed with much cheerfulness.

Under the revivifying effects of the beverage the emergency operator ventured to make complimentary reference to the way in which the unusual demand was being met, albeit with the reservation that the eatables, although delectable and pleasingly presented to notice, might have been held by some to lack the solidity necessary to meet the needs of a dinnerless evening. The recipient of the observation, apparently regarding the parenthesis as in the nature of suggestion or complaint, enjoined submission to the committee in accordance with ordinary procedure, from which no deviation even during air raids was allowed. An attractive group of senior operators was indicated as forming the committee the strict indivisibility of which was, however, proclaimed when the emergency operator, feebly facetious, repudiated belief in group systems, indicating preference for a system under which approach could be made separately to each committee member.

Late in the evening train traffic resumed and the majority of the operators then remaining went home. The air was cool and the night peaceful when the emergency operator himself left the building. A church clock announced the midnight hour, the dull rumble of some street traffic, belated by the raid, died away, and then all was still like the sword of a sleeping sentry. The raiders had returned to their dens.

In subsequent narration of the impressions of the evening the emergency operator was definitely eulogistic. Admirable the spirit displayed, praiseworthy, heroic, if you will. Heroic? Exaggeration of phrase was straightway imputed to him. They merely did their duty. Yes, but they did it in circumstances of exceptional risk and strain. And they did it willingly, cheerfully, bravely. Surely no misapplication of the word.

Perhaps he was right.

C. W. M.

SIEMENS

Established 1858.

Over 4,000 Employees.

ELECTRICAL CABLES AND WIRES BATTERIES TELEPHONE, TELEGRAPH AND SIGNALLING APPARATUS LINE MATERIAL

ETC.

SIEMENS BROTHERS & CO. LTD.,

Telephone:
CITY 6400 (7 lines).

WOOLWICH, LONDON, S.E.

Telegrams:
"SIEMENS, WOOLWICH."

Home Branches.

BIRMINGHAM—Central House, New Street.
CARDIFF—89, St. Mary Street.
GLASGOW—66, Waterloo Street.
MANCHESTER—196, Deansgate.

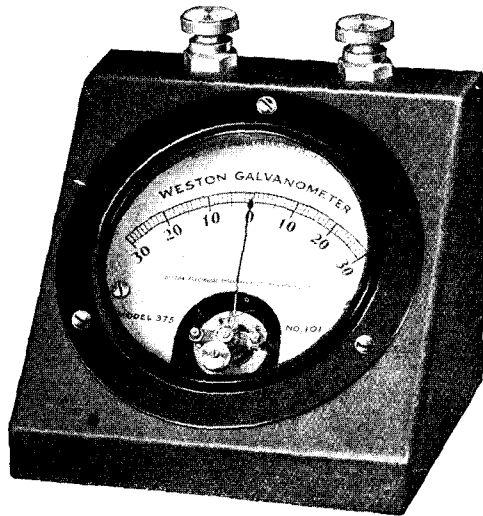
NEWCASTLE-ON-TYNE—
64-68, Collingwood Buildings.
SHEFFIELD—22, High Street.
SOUTHAMPTON—46, High Street.

Indian and Colonial Branches.

CALCUTTA—Clive Buildings, Clive Street.
BOMBAY—Rampart Row.
MADRAS—Smith's Corner, Mount Road.
SINGAPORE—1, 2, 6 & 9, Winchester House.
JOHANNESBURG—Siemens' Buildings.
CAPE TOWN—7 & 11, Waterkant Street.
SYDNEY—42, Bridge Street.

MELBOURNE—Dominion Chambers, 59-61, William Street.
WELLINGTON (N.Z.)—A. & T. Burt, Ltd., Courtenay Place.
DUNEDIN (N.Z.)—A. & T. Burt, Ltd., Stuart St.
AUCKLAND (N.Z.)—A. & T. Burt, Ltd., Customs Street West.

WESTON STUDENTS' GALVANOMETER



MODEL 375.
List Price, 40/-

Write for full particulars to:—

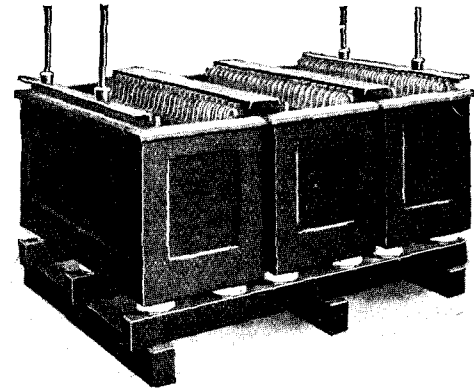
WESTON ELECTRICAL INSTRUMENT CO.

AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR CO., LTD.

Hart Storage Cells are BRITISH MADE and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

**SPECIAL TYPES of HIGH DISCHARGE CELLS
FOR TELEPHONE EXCHANGES.**

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

WIRELESS SIGNALS FOR THE HOME

AN IMPORTANT INNOVATION

The Marconi Official Gramophone Records

IN order to meet the present need of skilled instruction in Radio-telegraphic Receiving, the Wireless Press, Limited, have had prepared for them by the Gramophone Co., Ltd., a series of 6 double-sided gramophone disc records, which can be used on any talking machine using the ordinary needle method of reproduction, giving signals in Morse characters as heard by wireless operators.

Single 10" Record, 3s. 6d. (Postage and Packing, 8d. extra).
Set of 6 10" 21s. (Packing and Postage Free).

Write for particulars—

THE WIRELESS PRESS, LIMITED,
MARCONI HOUSE, STRAND, LONDON, W.C.

STANDARD TECHNICAL WORKS

- AUTOMATIC TELEPHONY.** A clear description of the Strowger Automatic Telephone System as adopted by the G.P.O. By S. TURNER, E.-in-C.'s Office. 32 pp., illustrated. 7d. net, post free.
- TELEPHONE TROUBLES, AND HOW TO FIND THEM.** On both the Magneto and C.B. Systems. Sixteenth Edition. 7d. net, post free.
- NOTES ON TELEGRAPHY.** By G. MOGG. A simple exposition of the rudiments of technical telegraphy and telephony. Specially designed to meet the requirements of the C. and G. Ordinary Examinations. 2s. 6d. net, or 2s. 9d. post free.
- THE TELEGRAPHISTS' AND TELEPHONISTS' NOTE BOOK.** Third Edition. Highly spoken of by leading P.O. officials. Price 1s. 6d. net, or 1s. 7d. post free.
- QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY FINAL EXAMS., 1906-15.** By H. P. FEW, Silver Medallist. An invaluable work, recommended by the leading technical journals. Limp Cloth, 8vo., 1s. 8d. net, post free.
- THE TELEGRAPHISTS' GUIDE.** By BELL and WILSON. The best work of its kind. For teachers and students alike it is invaluable, and the repeated calls for fresh editions prove its merit. Sixteenth thousand. 2s. net, or 2s. 3d. post free.
- TECHNICAL TELEGRAPHY.** By ROBERTS and BURROWS. Fifth Edition. Contains an exhaustive selection of questions and model answers in all grades of the C. and G. exams. 2s. net, 2s. 2d. post free.
- QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY.** By H. P. FEW. Includes model solutions to the C. and G. exams. 1904-1914, as well as to several typical questions set at the Post Office Departmental exams. for Overseerships. Fourth edition. Cloth. 230 pages, 172 illustrations. 2s. 6d. net, or 2s. 9d. post free.
- PRACTICAL TELEPHONY.** By JAS. BELL, A.I.E.E., and S. WILSON, A.M.I.E.E. A simple and practical handbook suitable for students, artisans, &c. Copiously illustrated. Latest edition. Twelfth thousand. 3s. 6d. net, 3s. 9d. post free.

Sent post free at prices stated by

S. RENTELL & CO. Ltd., 36, Maiden Lane, Strand, London.
WRITE FOR CATALOGUE NO. 36.

TELEGRAPHIC MEMORABILIA.

SINCE this April column went to press the great gale has come and gone leaving behind it a track of telegraphic devastation possibly unparalleled since the tempest of 1881. With a sudden change of temper the earth shook off its coat of white, and the sun shone out bright and smiling upon a tangled mass of wires and poles and struts and stays, just as though the whole scene were a huge joke and the very thing one would have asked for in the middle of a great war.

On a journey to the Eastern Counties, made necessary indeed by this selfsame storm, a party of telegraphists were witnesses of many of the freaks and caprices of this Wind in a Frolic. Broken wires by the mile, twisted in and around one another in tangled knots, poles making every conceivable angle with the track except the conventional one and except perhaps in one instance where one had apparently turned a complete somersault and had alighted with its head and insulators stuck firmly in a muddy ditch, while what was originally its base was reared skyward, from which a muddy tuft of grass hung downward looking for all the world like the gruesome pictures of guillotined French aristocrats in the revolution. Such was the picture as the train steamed slowly along lengths of restored railway in the fading light of a March afternoon.

On arrival of the party at their destination, for a few at least, there was no rest that night. Local labour being short, and material far away, departmental demarcations became obliterated and the engineering and commercial staffs just shut up the rule book and mutually helped when and where they could in the united endeavour to rig up a temporary telegraph office in a spot certainly not designed for this purpose. Was an ink-can required? A cigarette tin and a scrap of twisted wire were dragged into use. Was there a lack of table-accommodation? Fish boxes from the shore were commandeered, dried, sawn up and fitted. Was a "finished" receptacle required? Somebody's starch supplied the need. Did apparatus arrive? All hands were ready to open cases and unpack. Were further facilities demanded for Service correspondence? Further accommodation was speedily provided by an appeal to the authority and needs of the King, and to a very obliging serjeant of the guard, who loaned a few planks, "for the period of the visit only," and by the use of a couple of huge cases borrowed *without authority* (please don't tell Mr. Morgan) from the Controller of Stores.

For five or six days telegraphic communication was maintained with a distant land by these temporary measures, in an "ark on the sands." Never for a moment, from start to finish, 24 hours per day, did the whirr of wheels and the pulsation of signals cease, not even when "things from above" dropped more or less lightly on the surrounding land, and the sentries opened their friendly dug-out ready for emergencies.

Perhaps more may be written one day on this as on many other telegraphic and telephonic incidents of the war. All that may be said at present is to thank those members of the engineers' staff who so unstintingly co-operated and to enter one gentle protest against a most friendly communication which has since been received from somewhere in England, and which terminated in the somewhat ambiguous sentence, "Although we experienced four air raids while your party were here, we have had *none since the very day of your departure!*"

The publication of the official report on the treatment of the British prisoners in Wittenberg is not likely to have ceased to stir the sympathies of their kith and kin in the homeland. Those, therefore, who were even but slightly acquainted with Mr. David Jones, of the Central Telegraph Office, London, and who is even better known as the secretary and handicapper of the Centals Athletic Club, will probably and involuntarily turn their thoughts towards him and his situation in the internment camp at Ruheleben, near Berlin.

True, this is not a military but a civil internment camp, and happily its inhabitants have been saved the refined cruelty and the superlative misery of our unfortunate countrymen who chanced to come within the notorious centre of Prussian criminality.

Ruheleben has its amenities. Since the withdrawal of the military, and the vestment of the control of the camp in civilian officers chosen from the prisoners, there has been a marked improvement in its general condition. The camp shelters about 4,000 men including university men, engineers, doctors, musicians, teachers, and professional footballers, other athletes, &c., &c. With the British genius for organising (despite all opinions of the cynics to the contrary) out of this medley of talent has been co-ordinated a male voice choir, cinema show (the building was erected by the prisoners themselves), athletic and literary clubs, and a miniature London of shops and stores.

Fresh from the press the writer has had the privilege of perusing one precious copy of a local literary production, printed (unfortunately) by a German University press for the British authors and called "Prisoners' Pie," which with its highly artistic cover, and interior sketches, its first-class articles and its odes and other verses should one day rank amongst the most valuable literary curiosities of the war. The face value of this production should be multiplied manifold by the time a stray and rare copy reaches Christie's, in the years to come. One sketch speaks volumes of the unspoken thoughts of our exiled countrymen. It is a picture of two prisoners playing a game of chess in winter, and just inside the wire entanglements of an internment camp. The game is apparently a difficult one as the snow has evidently fallen and all but covered the board since the last piece was touched. It is a picture of cheerlessness and its double meaning will be instantly understood. It is entitled "A Slow Move!"

Apart from the fact that these civilians are permitted a certain amount of restricted liberty, the situation must indeed be a weary one. One of the most trying conditions is the lack of really good food. Were it not for the parcels which are sent out from England by one and another from time to time it is more than probable that many of the prisoners would succumb. So far as our colleague Mr. David Jones is concerned, who, by the bye, has been a prisoner since his interrupted holiday at Sobernheim, in July 1914, a parcel of food has been sent out each week since June 2, 1915, and these it has been possible to augment occasionally, by the generosity of friends.

It should be understood that a community of interests is the main principle of this very real brotherhood, for the poorer members of the camp who may not be fortunate enough to receive parcels from home, are looked after by others. In the event of any reader being desirous of assisting in this matter, the writer can assure him or her that cash or goods would be very gratefully received by Mr. Leonard Coombs, "F" Division, C.T.O., who has organised the Davy Jones Fund, which it will be noted reaches some of the poorest of our telegraphist colleague's fellow-prisoners.

One normally reads the Correspondence columns from week to week with considerable interest, and not infrequently with much instruction. That recently appearing from Mr. Baxter and Mr. Thornburn in the discussion as to what was the correct answer to the question. "If you failed to hear the distant station's speech in your telephone (on the Field), state what was likely to be wrong and how you could obtain his 'message,' and the reply, 'use the Morse key,' was such as to provoke some comforting meditation in the heart of the telegraphist.

Such an one thus engaged was overheard to murmur pensively, and but very slightly altering Charles Kingsley's "Soliloquy on women"—"Kindly, Morse, Dear Morse, to thy dear hands we must all come at last!"

Our friendly contemporary *Electricity*, writing under "Current Topics" and remarking on the opinion expressed in this column anent the "commercial" knowledge of the average Post Office engineer, somewhat damps down my youthful enthusiasm by agreeing so far as to add that, "he (the average P.O. engineer) is quite sufficiently commercial to meet the requirements of a service which seldom calls for any striking initiative on the part of the general body of its engineering staff." On the whole, however, "from personal knowledge" of P.O. engineers, *Electron* is prepared to allow that the claim made over the initials below is a just one.

In a later paragraph this writer goes on to admit "that genius is by no means lacking in the Civil Service," and that numerous instances have been heard of, in which a subordinate engineer or member of the technical staff has put forward really brilliant suggestions only to have them pigeon-holed by an officer of superior rank who did not appreciate their importance. Doubtless such incidents have happened in the Service, and, it may be added—outside it!

The writer makes a very good hit however when he refers to the "plums," and points to the plate of photographs recently published with the TELEGRAPH AND TELEPHONE JOURNAL, where only one of the prominent officials therein portrayed is directly connected with the technical or engineering staff, "*the very backbone of the administration.*" The italics are mine.

One has only a few lines of space for a remark or two on Mr. Batchelor's enthusiastic article on "Phonograms and Telephone-Telegrams," and those must be reserved for the superlative praise of the telephone-telegram system, the "astonishing success of which, in a brief space bids fair to raise a new method to the almost complete mastery of the existing difficulties caused by the depletion of telegraphists owing to the war." One would like to have had a few specimens of the traffic dealt with which have been so masterfully dealt with. One would appreciate a few more figures in the direction of operator averages, average line-time per telegram, and total output for periods covering the busiest and slackest portions of the 24 hours, and one would esteem it as a favour to know whether the daily average of Dewsbury, the example quoted, is to be taken as a criterion of the type of office and telegram which have served to pronounce so favourable a verdict upon the "new" system. These points are raised in no carping spirit, but when one has seen some of the results of diluted labour and, without offence, diluting machinery, one may be pardoned for not accepting the note of unqualified success without a certain misgiving that this same high note may possibly prove to be at least a quarter of a tone out!

As a token of the methods of a certain type of Pan-German writer, attention may be directed to the fact that the works of Zetzsche and Karrass, which bear the misleading general title of *Geschichte der Telegraphie*, and which would lead one to suppose that the contents dealt with the world-wide history of telegraphy, deliberately omit reference to anything or anyone except it or they prove to be of distinctly German origin! As a chivalrous counterpoise to this narrowness of spirit, one can read with pleasure the pages of M. Montoriol's *La Technique Télégraphique depuis l'origine*, which although it distinctly adds the words "en France," nevertheless pays generous and catholic tribute to such names as Faraday, Bain, Ohm, Wheatstone, Maxwell, Siemens, Hertz, Kelvin, Preece, Pupin, Marconi, &c. Perhaps with the editor's permission a complete review of this interesting French production could be given in these pages. The volume has been published by the French Minister of Commerce in the present year.

J. J. T.

PERFORMANCE OF "EVERYMAN" BY MEMBERS OF C.T.O. STAFF.

On Wednesday, Feb. 15, at the Ashburton Hall, Red Lion Square, the members of the "Interkom Klub" (Intercommunication Switch C.T.O.) gave a most interesting and instructive "open night" in the shape of the old medieval morality play "Everyman."

The proceeds, together with those resulting from several other entertainments, will be devoted to the Post Office Relief Fund.

The members of this club have proved themselves most versatile in their selection of plays. Their programme for the season might have been considered ambitious—by anyone not knowing their capabilities. Those who had the privilege of witnessing "Everyman" will appreciate the beauty of the play and the intelligence and skill with which it was produced.

The undertaking from many points of view was a bold one, but those who embarked upon it—both players and stage managers—are to be congratulated. The results well paid them for the strenuous work it must have entailed. No scenic effects were possible in a play of this description—but the blending of the colours in the dresses and the grouping helped in the production of some very fine tableaux.

REVIEWS.

Wireless Transmission of Photographs. By Marcus J. Martin. Published by The Wireless Press, Ltd., Marconi House, Strand, W.C. 117 pages. Price 2s. 6d. net.—Attempts have been made with more or less success during the past 70 years to develop a method by means of which it would be possible to transmit pictures over a telegraph circuit, and within the last decade experimenters in this field have been at work endeavouring to design a system of picture transmission in which the impulses sent out from the transmitting station shall be conveyed to the receiving station by means of Hertzian waves instead of by the use of a metallic conductor.

The use of Hertzian waves for this purpose has the great advantage that the retardation and distortion of the signals over a line are eliminated. Of course other complications, not met with when a wire is used, are experienced, but these are gradually being overcome, and the wireless transmission of pictures gives every promise of developing into a practicable addition to the present means of communication.

The book under review describes the previous work which has been done in this field, and gives detailed instructions by which anyone taking up wireless telegraphy as a hobby can extend his researches into this new field.

We think that such an extension will be welcomed by many wireless amateurs who are rather mechanically than mathematically inclined. From our experience of many home-made wireless stations we are of the opinion that the average amateur quickly tires of his hobby unless he has some deeper interest in it than merely "fishing" for signals from working stations, or exchanging messages, at a speed of about five words a minute, with some other amateur in the same neighbourhood.

Unfortunately, to go beyond this stage, and to start making measurements, which is the only way by which the hobby can be removed from the plaything stage to that of serious investigation likely to produce some useful results, requires a knowledge of electrical theory which the average amateur does not possess.

Details are given of the mechanical devices and photographic processes necessary to commence experimenting with picture transmission, and we can recommend the book to wireless amateurs as affording them a means by which they can fill up their enforced idleness during the suspension of their hobby during the war. The various mechanical arrangements described could be made now without infringing the provisions of the Defence of the Realm Act, in readiness for the time when the piping times of peace are once more with us, and wireless sets can once more be brought into use.

We notice on page 25 a formula $T = w \times t \times s$, which should be $T = \frac{w \times s}{t}$. On page 56 "ammonium" is spelt "ammoniac," and in three places "d'Arsonval" is spelt "de'Arsonval."

On page 57 the author expresses surprise that the iron stylus employed as the electrode in an electrolytic receiver using potassium ferrocyanide and ammonium nitrate should wear away, "as there is nothing very corrosive in the solution used, and the pressure of the stylus upon the paper is so slight as to be almost negligible!"

Also on page 58 he says: "The current required to produce electrolysis [with the receiver just mentioned] is very small, about one milliampere being sufficient. Providing that the voltage is sufficiently high decomposition takes place with practically 'no current,' it being possible to decompose the solution with the discharge from a small induction coil." Apparently the author is under the impression that it is the product of the voltage and current which determines the amount of chemical decomposition which takes place, although he follows the extract just quoted by explaining that the quantity of an element liberated in electrolysis is given by the product of the electro-chemical equivalent of the element, the current, and the time during which the current flows.

But weakness on theoretical points such as the above does

not detract from the merit of the book, which is essentially one for the practical experimenter. It is well printed, the diagrams are clear, and it can be recommended to anyone interested in the subject as giving them in a compact form information which they would otherwise have to seek from sources scattered among patent specifications and other technical literature.

Elementary Lessons in Electricity and Magnetism. By Silvanus P. Thompson, D.Sc., B.A., F.R.S., F.R.A.S. Published by Macmillan & Co., Ltd. Third Edition. 744 pages. Price 4s. 6d. —Most students of electricity and magnetism will be familiar with one or other of the earlier editions of this book. The second edition was published in 1895. Many excellent elementary books on the subject have since appeared, but these have mostly been written as text books for the use of students preparing for examinations. Silvanus Thompson's book, on the other hand, is without doubt the one which has best met the needs of that increasing class of readers who wish to obtain a broad outline view of the science, more from the point of view of general interest than with the intention of studying for any particular examination. Owing, however, to the enormous advances which have been made in the science of electricity since 1895, the second edition is nowadays seriously behind the times, and the present up-to-date edition, which contains 122 pages more than the previous one, will therefore be welcomed.

To those who know the earlier editions we need only say that the standard of these editions has been fully maintained in the new one. For the information of any of our readers who may not have seen the earlier editions we would say that, if they are interested in the subject, they could not make a better investment than by obtaining a copy of the present one. Even if they are only studying electricity for the sole purpose of passing an examination we feel sure that the breadth of outlook and the great "readableness" of this book will repay them for its perusal, and will render far more interesting and intelligible the special "cramming" necessary for their examination which they will obtain from the other books they are reading.

Wireless Telegraphy and Telephony: A Handbook of Formulae, Data and Information. By W. H. Eccles, D.Sc., A.R.C.S., M.I.E.E. Published by "The Electrician" Printing and Publishing Co., Ltd., Salisbury Court, Fleet Street. 418 pages. Price 12s. 6d. net.—In every branch of engineering it is, of course, physically impossible for the engineer to carry in his head all the various facts and formulae which he uses in the course of his work, and the need is therefore felt for some means by which information on any particular point can be rapidly turned up when required.

This want is satisfactorily met for mechanical and the generality of electrical engineers by the many excellent pocket books which have been published on these branches of engineering. Up to the present, however, no exactly similar book has been brought out for the special needs of the wireless telegraph engineer.

Wireless engineering, however, covers a greater range of different subjects than any other branch of the profession, and therefore the need of a reference book is all the more keenly felt.

The book under review has been brought out in order to fill this evident gap in technical literature. The ground covered is so wide that it has been necessary greatly to condense the information given, but this condensation has not been pushed so far that any point is left unintelligible for the want of sufficient explanation.

For the same reason it would be difficult for us to give a detailed account of the very various matters with which the book deals. Suffice it to say that, as far as we have been able to judge, there is hardly a point which the wireless engineer is likely to meet in the course of his work, on which he will not find information and guidance.

The book is well printed, strongly bound, and is of such a size and form that it can be carried with the minimum of inconvenience. We can strongly recommend it to all who are in any way connected with the practical aspects of wireless telegraph engineering.

OUR MONTHLY RECORD OF NAVAL AND MILITARY HONOURS.

THE following members of the staff connected with the Telegraph and Telephone Services have been mentioned in despatches or have been honoured by other marks of distinction. The Editor will be greatly obliged if surveyors, superintending engineers, or postmasters will, where possible, send him photographs of the officers concerned, and any available information with respect to the deeds for which they have been honoured.

Sapper M. MALONEY, Royal Engineers, Signal Service (Unestablished Skilled Workman, Engineering Department, South Lancashire District), has been awarded the Distinguished Conduct Medal.

Sapper J. E. TAYLOR, Royal Engineers, Signal Service (Unestablished Skilled Workman, Engineering Department, South Lancashire District), has been awarded the Distinguished Conduct Medal.

Driver C. T. BOLD, Army Service Corps, Northumbrian Division (Clerical Assistant, Engineering Department, Northern District), has been awarded the Distinguished Conduct Medal.

Second Corporal W. J. HAWKINS, Royal Engineers, Signal Service (Labourer, London Engineering District), has been awarded the Distinguished Conduct Medal.

Company Serjeant-Major W. T. HUSBAND, 2nd Battn., London Regiment (Royal Fusiliers) (Skilled Workman, Class II, London Engineering District), has been awarded the Distinguished Conduct Medal.

Serjeant G. H. SIMONS, Lincolnshire Regiment (S.C. & T., Lincoln), has been awarded the Distinguished Conduct Medal.

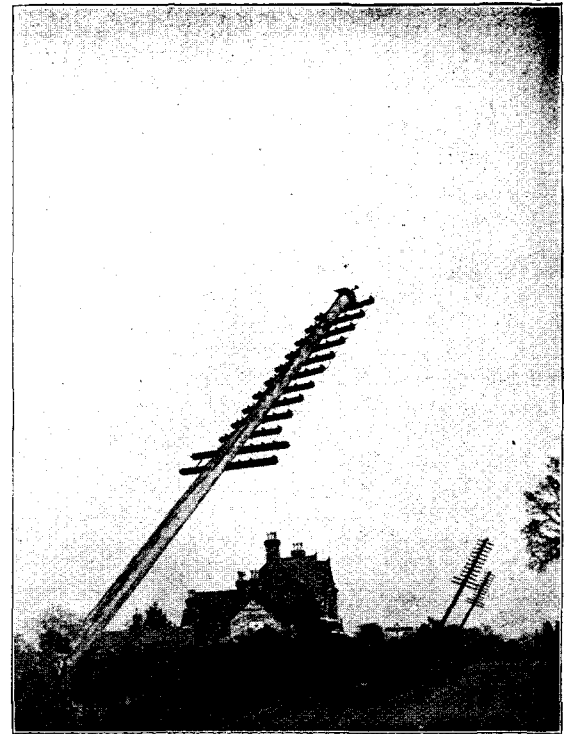
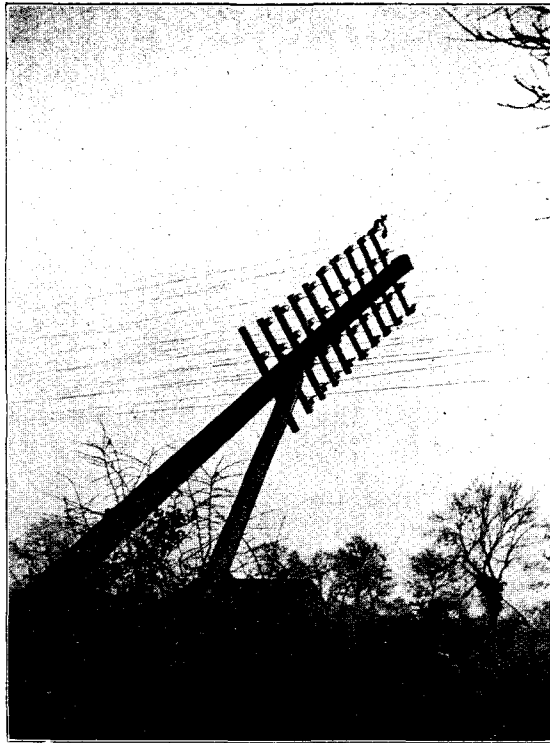
THE MALLOCK-ARMSTRONG EAR-DEFENDER.

WE wish to call the attention of our readers, more especially of those who are with the colours, to this device, which is designed to defend the drums of the ears from the possibility of shock. Although by means of the ear-defender loud sounds are modified and shock is absolutely eliminated, ordinary conversations and telephone messages are perfectly audible whilst wearing the apparatus. At the same time the wearer may stand beside a twelve-inch gun when it is being fired without being deafened even temporarily by the explosion. There is no doubt that terrific noises have a more distracting effect on the nerves than almost any other sights and sensations of war, and the nervous exhaustion due to intolerable sounds, not to mention actual gun-deafness, is a fruitful cause of invaliding of fighting men.

During gas attacks, when the gas helmet is worn, telephonists have had the greatest difficulty, often amounting to positive impossibility, in hearing messages, and this it is claimed had been remedied by wearing the Mallock-Armstrong ear-defender in the ears under the helmet; in some cases officers have perforated the side of their helmets and put the defenders in their ears through the material of the helmet. As there is a diaphragm completely closing the hollow passage in the defender, gases of course cannot enter the helmet under this latter condition. We hear that situations have occurred at the Front where the defenders have been of vital importance to telephonists and those depending on them, and it is understood that at the present moment a more extended use of the defender is receiving official consideration.

OPERETTA AT LEEDS IN AID OF THE P.O. WAR RELIEF FUND.

In the absence of so many of their departmental male *confères* with the Army at the present time, 26 of the trunk telephonists at Leeds rendered the operetta "The Mystic Mirror" in the Albert Hall, Leeds, on March 7, and all the parts, male and female, were impersonated by the ladies themselves, in appropriate costumes. The operetta drew an audience of 1,250 and realised £50 as an extra contribution to the Post Office War Relief Fund. We present a photograph (p. 176) showing a group of some of those who took part in the operetta for which, by the way, they were effectively trained and stage managed by Mr. W. H. Shaw, of the Telegraph branch.



STORM DAMAGE IN THE MIDLANDS.

THE INTERPHONE.

THOSE who are in the habit of regarding the telephone as an instrument connected to a public exchange possibly do not realise the enormous number of private telephones that are fitted in business premises. There are very few factories or business houses nowadays that have not a private system installed as well as the telephones giving public service, and as these private instruments are not controlled in any way by the Post Office, it can readily be imagined that in construction and efficiency they vary considerably. In the past this was even more noticeable than now, because formerly the manufacturers who specialised in private telephone work did not as a rule make the standard instrument and apparatus used for large exchange work, while firms who specialised in this latter class of apparatus seldom troubled about private equipments. During the last few years, however, matters have changed somewhat and firms whose main business is with what may be described as the heavier type of telephones, have also devoted considerable attention to the lighter types of instruments. One of the most popular forms of private installations is the interphone, and the latest type of this class of instrument as recently placed on the market by the Western Electric Company, Limited, may be of interest as showing the progress which has been made in this direction. An examination of the mechanical construction shows that the private telephone receives as much care in its design as does the public service instrument. In this model great strength combined with lightness and a pleasing appearance is obtained by mounting all the mechanism on a light metal framework surrounded by a polished wood case. The selection is effected by means of automatically replaced push buttons, one button serving to both select and call the required number. The cradle switch is so constructed that by a simple adjustment a wall instrument can be converted to a desk instrument and *vice versa*. The hand microtelephone is rather novel in construction, and special means are taken to obviate any possibility of loose screws or broken handles. As interphones are only suitable for comparatively short lines, no induction coil is fitted, the transmitter and receiver being in series. Calls are received on a small buzzer contained in the instrument. The speaking circuit is a simple

central battery one, a double wound retardation coil of high impedance being fitted in each set. The telephone is designed for metallic circuit wiring, and, with properly paired cable and good dry cells, entire freedom from cross-talk is obtained. The set opens in two places, the top carrying the mechanism rises for inspection and repairs, and the whole of the body rises from the backboard which is fitted with large well spaced line terminals. This double opening allows of very simple connecting up and overhauling. Two central batteries are required consisting of three or four dry cells for speaking and four or five dry cells for ringing. The whole instrument is an example of careful design and finished execution, and its reception by private telephone users has shown that there is a very real demand for high class instruments.

CORRESPONDENCE.

PHONOGRAMS AND TELEPHONED TELEGRAMS.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

I HAVE read with interest Mr. Batchelor's admirable article in the April issue of the JOURNAL on the question of phonograms, &c. I think every traffic man will agree that the wider introduction of transmitting telegrams over the telephones is proving remarkably successful. The idea of "in" and "out" junctions between the instrument room and the Central Exchange is a good one. Do these go through the "feeder position"? I do not quite follow Mr. Batchelor in the advocacy of a typist on an incoming position. I presume the typist would work in the phonogram room, and if necessary, several could be so employed. Typewriting might then have to be added to the many other accomplishments of our telephonists.

With regard to a reduced charge for deferred telegrams, I have been under the impression that most telegrams were urgent, at least to the sender, but as Mr. Batchelor appears to be a telegraph man, perhaps he can contradict this. However, I think I can see many difficulties ahead in regard to this question. Although use might be made of idle junctions in the slack telephone time, yet what about staffing? An increase of staff following the loading of the junctions with telegrams during the hours 12 to 3 p.m. seems to be a *sine qua non*. The whole question, as it appears to me, is not one of impracticability, but of finance.

The American system by which subscribers give telephone messages to monitors for them to transmit, at an increased fee, might, I think well be considered in conjunction with Mr. Batchelor's idea. I am in full agreement that junctions should be put to some use in the quiet hours of the day. In fact in this district many of the junctions are used for telegrams in the afternoons, such as LV—Blackpool, &c. A junction has also been taken up

between Southport and L V for telegrams all day. It is working splendidly and as many as 32 telegrams have been dealt with in the busy hour without complaint.

It is also to be hoped that after the war the question of subscribers' spreading their calls more evenly over the day will be further pursued.

I wonder if the suspension and alteration of mails and letter deliveries has had any effect on this phase of the question. The ratio of day to busy hour in this district does not appear to have been affected much in comparison with pre-war days. The question of each district's arrangements for telephone-telegrams could, even at this time, I think, be well considered. I am quite certain there is room for improvement in many ways.

I thoroughly agree with Mr. Batchelor, when he says "Facilities for the study of such problems should be accorded *ad lib* to enthusiasts." I am only afraid that traffic men, often like the telephonist, know only too little of what happens at "the other end."

J. A. W. GREGORY

Preston, April 12, 1916.

(Assistant Traffic Superintendent).

LONDON TELEPHONE SERVICE NOTES.

IF there is one thing more than another which in these crowded days of war emergency work emphasizes the bewildering rapidity with which month follows month, it is fact that one has scarcely disposed of the copy for "London Notes" before, as it seems, one is faced with a reminder that they are again due! Yet though they make such frequent demands on one, there seems no lack of matters which ought to be noted.

The London Telephonists' Society held their last meeting for the session on Friday, March 17, and save in one particular it proved a peculiarly happy gathering. The L.T.S. Orchestra discoursed sweet music at intervals, and members owe a deep debt of gratitude to Mr. William C. White, the conductor, for the work he has done in connexion with this offshoot of the Telephonists' Society. Excellent essays were read on "Portia as the Ideal Supervisor" and "Jane Eyre as the Ideal Telephonist." The audience were also treated to a recital of the lines on "Accuracy, Courtesy and Speed," by Miss McMillan, who was awarded the prize for the best verses on the subject of these three cardinal points of good operating, it being a condition of the competition that the lines should be suitable for memorising by learner telephonists. All these literary efforts brought forth loud applause from the auditors generally, and a special mead of praise in a happy little speech from Miss Heap. The one drawback to the pleasures of the evening was the absence, owing to indisposition, of Colonel Ogilvie, who had promised to distribute the prizes and give a short account of his visits to the Army in France. He wrote a letter expressing his regret that he was unable to be present, and this was read out by the Chairman, but it is safe to say that whatever Colonel Ogilvie's regrets may have been they could not in measure equal those of the company who were thus robbed of his genial presence. His address we hope is only deferred till some date in next winter's session—his duty as distributor of awards was undertaken by Mr. G. F. Preston, who had a word of praise and encouragement for each recipient as she came up to carry off her well-earned reward.

The election of officers for the coming session resulted in the presidency passing to a highly popular member of the Secretary's traffic staff—Mr. J. Stuart Jones. We feel sure that the society has a most successful year in front of it.

The Telephone and Telegraph Society held their usual monthly meeting on March 27, when Mr. J. M. Rusk read a paper on "Telegraph and Telephone Work in a Provincial Stores Depot." The subject might appear at first sight a difficult one in which to interest an audience not actively engaged in "Stores" work, but Mr. Rusk's touch is a delightfully light one as witness his reference to the "cloistered calm enjoyed by 'one's colleagues in a head-quarter's office,'" and he made even rate-book descriptions of cable sound interesting.

"Change is our portion here," sang the hymn-writer, and one could almost fancy he (or was it she) had had experience in the office of the Controller of the London Telephone Service. If we are not moving our quarters, we are changing branch designations, and if we are not changing branch designations we are welcoming new chiefs or receiving the blessings of departing ones. Failing one or other of these variations we are subject to a condition embracing the whole series. We seem to be approaching the latter

condition just now, if accomplished fact should be succeeded by fulfilled rumours. It is unusual in the Navy for an "A.B. to go to stoke," but many things which would be regarded as unusual in the fighting services are accomplished in the peaceful service of the telephones. Mr. Berlyn, who has been anxious for some years to leave London's lure in order to pursue provincial postal problems, has been chosen to succeed Mr. Tom Taylor as Postmaster of Stoke-on-Trent, and left Queen Victoria Street on April 7. He carries with him the best wishes of the L.T.S. for his well-being in his new sphere of duties. In these war days anything like a general subscription for a present was out of the question, but Mr. Berlyn was not allowed to depart without a reminder of his London colleagues' regards. A silver milk jug, flower vase and two sweet dishes added to the responsibilities and liabilities of the contractor charged with the removal to Stoke of the new postmaster's household effects.

So much for accomplished fact, but rumour is already busy with the name of another highly placed officer in the L.T.S. In this case the fortunate one is destined, so it is stated, for what Mr. Rusk would describe as the cloistered calm of a headquarter's office, and it is further alleged that he will be able to put these mystic letters after his name—D.C.I.O.T.A.T.T.A.O. That beats even the Army's best efforts at alphabetically curtailed descriptions of office, and reminds one of a game beloved of childhood's hours "TIT, TAT, TO, my first go!" Well these are but rumours so far, but it is leap year and strange things are reputed to happen in such years—we may even get another Feb. 14—who knows? For our part we have always regretted that the traditions of the day have not been fully maintained.

We hear that Mr. Thwaites, the Exchange Manager of Croydon, has been winning laurels in the Flying Service. He visited the Croydon Exchange recently and confirmed the report that he was the pilot on a British aeroplane which not long ago brought down a German machine. Mr. Thwaites, so we are informed, flew the capture over to this country and made his return to France by air also, but on the latter occasion he piloted a British craft. It is understood that he had made aviation his hobby for years. We wish him a safe return from his present perilous occupation to the level course of the L.T.S., where the only flights allowed are flights of fancy.

Several of the members of Paddington Exchange staff undertook one of the weekly concerts at the Post Office Home Hospital, and on Friday, April 7, they went thither in the guise of the "Young Hopefuls" to cheer up their wounded comrades with "mirth and youthful jollity." That they had succeeded in their mission was clear from the first—applause greeted their appearance and swelled in mighty waves as one or other of the talented party stepped to the fore and sang or recited.

These Notes cannot be closed without a reference to the "nine days' wonder" of the threatened eight-hour day. How excited we all were, for here was the Civil Service generally depleted of men who had gone, at infinite sacrifice in many cases, to uphold the honour of a country "whose word was as good as its bond." Yet they, whilst fighting for the rights of others, were to be denuded of their own—an astonishing situation. Fortunately "wisdom was justified of her children," and after a petition had been presented to the King in Council, the proposal was withdrawn. God save the King.

ENTERTAINMENT TO WOUNDED SOLDIERS BY THE STAFF OF THE NEW CROSS EXCHANGE.

* The staff of the New Cross Exchange entertained for the second time a party of wounded soldiers at the Hanover Park Conservative Club on Saturday, April 1. The tickets were hand printed by the staff, and the designs on the programmes were hand drawn and painted.

An interesting programme was carried out including songs, recitations, violin and pianoforte solos also by members of the staff. A very laughable feature of the entertainment was a burlesque given by the New Cross Orchestra which was encored again and again.

After tea, a delightful function, Miss Epps, the Chief Supervisor, was presented with a bouquet as a token of appreciation of her kindly interest and help. Then a guessing competition for the soldiers took place, which caused great amusement. The soldiers left at 8 p.m. each bearing a parcel containing cigarettes, tobacco, sweets and fruit, and judging from the letters of thanks received, they spent a most enjoyable time.

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising { Mr. JOHN LEE.
Committee - - { Mr. J. W. WISSENDEN.
Managing Editor - Mr. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

MAY, 1916.

[No. 20.]

THE POSTMASTER-GENERAL'S REPORT.

THE Postmaster-General's report and the White Paper giving statements of account in respect of the Telegraph and Telephone Services for the year ended March 31, 1915, will be eagerly turned to by the many who are curious to see the effect of the war on the financial results of those Services. We shall no doubt be favoured with some chastening criticism on these results, especially on the telephone side, where although the exchange system shows a profit, yet, when the loss on the trunk system is taken into consideration, there remains a net loss of £111,018. This result is explicable and perhaps not altogether unexpected when it is remembered that ordinary economic considerations with regard to these great means of public communication must necessarily subserve the interests of the war. Where commercial development has been at a standstill, where traffic has decreased, and where it is impossible to readjust the staff immediately and entirely to such decrease, the only result can be decreased profits. The profit on the exchange system for 1913-14 was £395,664; the loss on the trunk system was £156,553, giving a net profit of £239,111. The profit on the exchange system in 1914-15 was £143,103 and the loss on the trunk system £254,121, resulting in a net loss on the Telephone Service as a whole. As regards the trunk system, the suspension of the Continental services accounts for a loss of many thousands. Furthermore, this service has borne the cost of transmitting telegrams over its system, a practice necessitated by the wholesale releases of telegraphists for active service, and one of the happier results of the close association between the two Services ensuing on the acquisition of the telephone system by the State. Steps are being taken to enable the necessary adjustment between the accounts for the two Services to be made in future.

Some analysis of the increased expenditure on the exchange system may be of interest. Administrative and operating expenses were increased by £82,426 or 5*d.* per station. This is partly due to the giving effect to the recommendations of the Holt Committee. Pension liability is increased by £34,506. The increase of maintenance costs by £144,673 (2*s.* 4*d.* per station) is largely accounted for by heavy additional storm repairs. Depreciation and renewals were increased by £99,204, or 1*s.* 2*d.* per station, and interest by £69,442, or 1*s.* 3*d.* per station. In this connexion, it must be borne in mind that a full year's charges on heavy capital outlay in 1913-14 and a half-year's charges in 1914-15 had to be met, with no compensating increase in stations owing to the unavoidable derangement of business involved by war conditions. Telephone stations increased by only 2.8 per cent. as compared with 6 per cent. in the previous year—a difference of over 25,000—and traffic declined by 2.3 per cent. as against an increase of 4.6 per cent. in 1913-14, involving a heavy loss of fees which may amount to anything up to £100,000. Here again it is not feasible to make economies in staff commensurate with the decreased traffic during the shifting conditions of war, when moreover emergencies may at any time arise requiring the services of the fullest possible staff. Lastly appears an increased item (by £59,169) for the pay of the Staff with the Colours—obviously an unavoidable one. These are, briefly, some of the qualifying factors which must be taken into account when criticising the accounts of a Service which is not only fulfilling adequately its important function in the commercial life of the country, but playing a vital part in the rapid communications which are so essential at every moment of the stern conflict through which we are passing.

TELEPHONES FOR TELEGRAMS.

THERE are two sides to every question, and we need not be surprised that a contributor should send us an article in which he shows that there are limits to the use of telephone circuits for the transmission of telegrams. It is quite possible that war conditions have had some influence in distorting our vision. The increase in the telephone rates has checked the growth of telephone traffic in certain districts, and telephone circuits have become available for the transmission of telegrams in a way which would hardly have happened in ordinary circumstances. But this may have opposite effects. While it may reveal to us the possibilities of the telephone as a medium for the transmission of written messages it may also reveal to us the limitations of the telephone for this purpose. The very success of the trials, including as they do the use of longer circuits than many of us believed to be desirable, has brought into bold relief the plain fact that it is only because the telephone circuits are there and are available that telegraphs can use them. We could hardly imagine a telegraph administration building long telephone circuits for the transmission of written messages. It is only when some arrest of telephone development on already existent telephone routes leaves gaps for telegraph traffic—itself somewhat attenuated—that the joint user of inter-urban telephone circuits is sound policy.

Put in this way we can see some indications of the right

conclusion. The telephone circuits which will always leave gaps for telegraph traffic are obviously those which connect sub-offices to head offices. Our contributor enounces the call office doctrine which is now generally accepted. A call office which is fulfilling its purpose as an educative medium offers a favourable opportunity for the transmission of telegrams. It may be that a certain amount of through switching is possible whereby telegraph transmissions will be saved, but in the broader aspect of telegraph traffic an extensive return to the earlier telegraph ideals of switching one town through to another for individual and occasional telegrams is hardly practicable. The contrary theory of loads borne upon regular routes is more akin to the modern development of telegraph machines, and that development seems to have in mind the closer association of machines for short distance wires with those for long distance wires. And it is quite conceivable that this conception of a telegraph organism will modify those ideals which regard telegraph transmissions with particular disfavour. If the work entailed by telegraph transmission is modified so that the labour involved is less than that involved in Morse signalling, it might be an advantage to work in this direction rather than in the direction of the through switching of a series of telephone circuits for the transmission of occasional telegrams.

It is, however, hardly wise at the moment to do more than to suggest that there is this, the other, side of the question. It is necessary in war time to adopt all manner of devices which as their central aim assist in the release of skilled telegraphists. Even when those devices are more useful than anyone dared to hope at the outset, it does not mean that they are part of what may be called the permanent progress of telegraphy. There are certain aspects of through switching from district to district, for example, the through switching of subscribers for phonogram purposes when local offices are closed, which seem destined to be a portion of the future telegraph methods. However interesting and even exhilarating it may be to speculate on the possibility of a revolutionised telegraph service with telephone circuits as its tributaries flowing into a central series of arteries, there is just as much interest and just as much exhilaration in speculatively regarding a telegraph service in the future which will convey the written or the printed word both over the main stream and over the thousands of tributaries. Probably in the event we shall find neither method solely in possession. Prophecy loves black and whites, but fulfilment often finds one of the many shades of grey.

THE ABOLITION OF ABNORMAL TELEPHONE RATES.

IN our October number last year, we commented on the increase of the subscriptions for unlimited telephone service. Since then another seven months of war have compelled us all to adopt many economies which are unwelcome; and the Post Office is similarly bound to do away with any privileges which cannot be defended on the ground of economy and which indeed may be regarded as contrary to its guiding principle of equality of treatment to all its clients. Amongst these privileges must be counted the obsolete measured and message rate tariffs for telephone service—tariffs which start as low as $\frac{1}{2}d.$ a call with a yearly minimum payment of 25s. These abnormal rates were offered in some cases as the result of competition between the National

Telephone Company and the Post Office or its other licensees, and in all cases before the completion of that close study of the costs of construction and maintenance which is so important a part of tariff-making. Those who followed the proceedings before the Railway and Canal Commission, when that body undertook to assess the price to be paid by the State for the National Telephone Company's plant and assets, know what is involved in the analysis of the cost of constructing and maintaining a big telephone undertaking, and how differences of opinion on the question whether any expense is proper to revenue or capital may in the aggregate involve a depreciation of value from £21,000,000 to £12,500,000. But this is a digression.

The abnormal rates are uneconomical in many ways. Firstly, they do not cover the full value of the service afforded. The value not to the consumer—which is an unstable factor—but the value to the provider which must in all cases be based on the cost of production and of working expenses together with a reasonable return on the capital invested. Then they involve extra operating costs. It is necessary to mark the indicators at the telephone exchanges in such a way as to indicate to the operators that the charges for the calls are at abnormal tariffs, and, however carefully such markings are conceived and carried out, it yet remains that each call involves an additional mental effort on the part of the operator; and each such effort of course increases the operating time of each call and reduces the number of calls which can be handled by one operator. In fact the whole machinery becomes more complex; mistakes must also be more frequent and complaints more numerous. All these factors involve increased cost.

Not only the operating but the accounting is more complicated. Separate account forms are necessary for each of the many tariffs and the clerical work involves a knowledge of a greater variety of tariffs and a corresponding mental effort in registering the charges. Under ordinary conditions such variation increases the expense; and it will readily be realised that further expense is caused under present conditions when many of the experienced officers in the district telephone offices are on military or naval duty, and the work is carried on by less experienced staff. Any additional complications in the accounting work of course react on the work of auditing and raise the cost of the audit.

The abolition of abnormal tariffs will therefore result in direct economies in staff for the Post Office and it should remove one of the main difficulties in effecting improvement of the service. The failure of a telephone call may be due to any of several causes, one of the most frequent of which is the overloading of the called subscriber's line. Subscribers at abnormal tariffs are prone to overload their lines and, as the provision of adequate telephone facilities would involve the surrender of the old contract, they are generally loth to agree to the reconstruction of their telephone equipment on modern principles.

Telephone men at least will agree that the suppression of abnormalities of tariff is an important step in the right direction.

TELEPHONE TROUBLE.

WE publish in another column a reprint of a drawing which illustrated the first circular on the subject of telephones issued by the Post Office. It was issued in 1877 and in the short history of telephony has therefore quite an archeological interest. We feel sure that our feminine readers will consider as archeological the costume and coiffure of the lady in the picture. We also reprint an illustration from the latest telephone pamphlet, *Telephone Trouble*, issued in the present year of grace. This brochure has attracted some attention in the Press. The *Lancet*, with a pro-

professional touch happily refers to it as "Prophylaxis of Telephone Trouble," and the *Evening News* in an amusing and discerning article as "Telephone without Tears." Other critics are not so friendly. They gird at its issue in war time. Such are indeed of those redoubtable spirits who hold that in these times we may do nothing except fight, make munitions, or conduct anti-German propaganda, esteeming very properly loss of life more than loss of meat, and loss of body than loss of raiment, but not enquiring too closely whence the necessary meat and raiment is to come even for the fighter and the propagandist if all civil pursuits are to be laid aside.

The booklet is not precisely an official production, as internal evidence discloses. It is written by a journalist in a sufficiently breezy style and brings out admirably two important points, viz., (1) that in all telephone calls four operators, two professional and two amateur, are involved, and (2) the necessity for trusting that the professional operator is doing her best for you. It may be that in some cases there are only three operators, two amateur and one professional, but this is a small criticism. In defending the operator the writer is very happy. "To put it on no higher ground," says the author, "she has nothing whatever to gain by deceiving you. It causes her extra work and is 'as much as her place is worth.'" The instructions as to telephone and postal facilities, he says, need to be studied "with the end of a wet towel round the head," but he is handsome enough to say they are worth mastering. We bow to this correction, and frankly admit that the pamphlet if less dignified is certainly less dull—to quote again—than official productions, and is quite worth mastering by the telephone user.

HIC ET UBIQUE.

THE election of Mr. A. B. Walkley to be chairman of the Telephone and Telegraph Society of London for the ensuing season is an event in the history of the society. Mr. Walkley is so frequently described by our contemporaries as a "distinguished literary man" that beyond quoting the formula we make no further reference to this aspect of his position in the world. To us he is a colleague whose conception of human relationships involves a considerateness for all those who serve him which draws from them their best in work and their highest in esteem. He is a chief whose ideals of responsibility include the appreciation of the lowliest work as of that which may seem to be more prominent, and a punctiliousness in judgment as regards individuals which is passionate to be just. Of course he is a thinker: of that the wide world is aware. But to us he is a thinker to whom no institution of which he is a part can be resolved into a mere machine, a mere "hive of industry." We shall look forward to his opening address with keen interest. It will certainly be unconventional; we are confident that it will be inspiring.

ANOTHER step in the development of a common organisation for Telegraphs and Telephones has just been taken. The staff of the Provincial Superintendents of Telephones has been amalgamated with that of the Telegraph and Telephone Traffic Managers. At the head of the combined staff will be Mr. R. A. Dalzell with the title of Chief Inspector of Telegraph and Telephone Traffic. He will have two Deputy-Chief Inspectors, Mr. Harvey Lowe and Mr. John Lee. Below these gentlemen will be five Inspectors, Mr. A. Martin, Mr. A. E. Cotterell, Mr. T. A. Prout, Mr. W. Napier and Mr. J. Stuart Jones. The Assistant Traffic Managers will in future be known as Assistant Inspectors of Telegraph and Telephone Traffic.

Mr. W. A. Valentine will take Mr. Lowe's place as Deputy Controller of the London Telephone Service.

WE have received a pamphlet of some length from Mr. J. C. Vail setting out the claims of his father, Alfred Vail, to his share in the invention of the system of telegraphy known as the *Morse*. We believe that there is a considerable literature dealing with the subject, but we doubt if there is any justification for Mr. J. C. Vail's contention that "some one is manufacturing telegraph history for future consumption." In the progressive stages between the germ, the bud and the flower of a great invention, many outside influences are at work, and much happens to obscure the true history of its first beginnings. We are disinclined to enter into the Morse controversy. We only wish to say that when Mr. Vail describes our reference "to transient and unhappy controversies" as "saving trouble to easy-going trade journals," he misunderstands our remarks altogether. He appears to identify us with Professor Taussig, from whose book we quoted, whilst all we did was to comment very briefly on Morse's beliefs and eccentric controversial habits.

ONE of our most regular and valued contributors aided by a faithful band has been engaged in a coast town in restoring telegraphic communication—interrupted by the recent storms—with a neutral country. Aerial visitants were in the neighbourhood four times during his stay, but the good work was duly accomplished by the party, which much appreciated the thanks they earned from the Postmaster-General.

WAR taxation in Germany has hit the telegraphs and telephones. The charges for local telegrams are increased by nearly 2d. (15 pfennig), and other telegrams by 3d. There is a 20 per cent. increase in all telephone charges, viz., on flat rates, on the annual charge for message rates as well as on each message, on each local junction or trunk call, and on each auxiliary line. We hear also that the deficit on the Austrian telephone service is to be met by increased charges, but we are not yet in possession of the proposed rates.

THE promotion of Mr. Berlyn, Assistant Controller, to the Postmastership of Stoke-on-Trent, removes from the staff of the London Telephone Service one who by ability and hard work has taken a full share in bringing up the service on the traffic side to its high standard of efficiency.

Mr. Berlyn, mainly for reasons of health, has long had ambitions for a provincial career, and at the time of the Transfer was, we believe, actually classified for a short time as an assistant surveyor. It was thought scarcely fair to Mr. Preston to withdraw Mr. Berlyn from London in the midst of the difficulties which attended the amalgamation of the P.O. and the company's systems. But now that the pressure is over, it has been found possible to accede to Mr. Berlyn's repeated applications for a provincial appointment. He carries with him the good wishes of a host of official friends.

THE following is an extract from report of an air raid:—

The resident operator had placed his wife and child in the basement at the sound of the first explosion, and with the very able assistance of the lineman, who was fortunately in the building, attended with commendable promptitude to the numerous telephone calls immediately asked for, giving special attention to the police calls for the medical men and the hospitals.

Great credit is due to these officers for the way they rose to the occasion.

WE heard at a recent meeting of the Telephone and Telegraph Society of London a novel explanation of the cause of stores surpluses and stores deficits and the scientific remedy. Scotsmen are inclined, so the speaker said, to give short weight—hence the surpluses; while Englishmen and Irishmen are temperamentally prone to give overweight and thus to cause deficits. His remedy was simple, though we cannot recommend it on the ground of morals. Strive not, he urged, to secure greater accuracy, but so select your staff that the surplusses of the Scot will be swallowed up by the deficits of the Sassenach.

THE CORRELATION OF PUBLIC ADMINISTRATION AND FINANCE.*

By F. C. COOK (of the Accountant-General's Department).

THE original intention was the submission of a few observations on the general subject of Administration and Finance. The addition of the word "Public" enlarges the conception of the paper, but the necessities of the case require that the document shall not extend beyond the recognised limits of time allowed. The more comprehensive title demands a degree of analysis. One definition of administration is the "Executive of Government; the persons collectively who are entrusted with the execution of laws, and the superintendence of public affairs." The same authority speaks of finance as simply the income of a State, public money, revenue. The two expressions appear to stand apart: they relate to two categories: they might exist without correlation. But the definitions of both expressions contain an allusion to functions of the State, and permit the use of the title Public Administration and Finance. The purpose of this paper is an endeavour to contribute something to the interrelation, the correlation of public administration and finance with special reference to the Post Office.



MR. F. C. COOK.

I should perhaps observe, at the outset, that I have consulted a number of officially published documents dealing directly or indirectly with administration and finance. I have sought to establish precisely what is the official mind on the subject: the investigations have revealed an apparent hesitation, a degree of doubt, as to a scientific definition. The authors of the official reports were accustomed to the ideas conveyed in the term administration: they were not so sure of their ground when it became necessary to introduce the word "finance." For example, the fourth report of the Royal Commission on the Civil Service gives prominence to the expression "administrative": very rarely, if at all, do the Commissioners use the word finance. Under the heading Organisation (i.e. of various public departments specially referred to) the brief description includes here and there, the term "financial." One of the reports of the Engineering Committee of the Post Office (1910) has the significant phrase "administrative and financial control." "Financial order," "financial regulations," "financial administration" occur in Treasury minutes mentioned in the handbooks to the Public Accounts Committee prepared by the Comptroller and Auditor-General.

If we turn from public documents to the text books of the Universities we find the same disagreement or want of precision. In one of Professor Bastable's well-known works there is an important note on the point. It may be regarded as sufficiently valuable to be quoted.

"The original idea (i.e. of finance) is that of paying a fine ('finare'): unfortunately in England the word has been used with a wider meaning, as including all monetary and even industrial facts. Thus we have *Jevons' Investigations in Currency and Finance*, Mr. Patterson's *Science of Finance*, and Sir R. Giffen's *Essays on Finance*, all dealing mainly with those wider questions. An English writer is therefore compelled in order to avoid misapprehension, to limit the word, as in the text, when he is treating of what the Germans can without inconvenience call *Finanzwissenschaft*, or the French *Science des Finances*. In French there is a convenient distinction between the singular and the plural, the former being used in the general sense, as in *La haute finance*, while the latter is reserved for public finance. Professor Adams has recently employed the term 'Science of Finance' to describe an investigation of public expenditure and public revenue. Professors Plehn and Daniels have followed in the titles of their manuals the example of this work (i.e. Public Finance)."

Towards the end of Professor Bastable's book a special place is given to Financial Administration and Control.

Having brought the terms public administration and finance into closer relationship we will enter upon our explorations. Our quest is one of the Departments of State, the British Post Office, and what its boundaries are in time and extent: in other words how far back and how far afield must our studies go if we are rightly to understand the financial administration of the Post Office in regard to the conduct of public business at the present time. I do not propose to deal with the history of the Post Office, or the history of any one of the departments of the Post Office. I am thinking

of matters which can never be lost sight of in the consideration of problems and proposals, however insignificant they may appear to be. In this connexion I will deal first with

Permanent Factors in Financial Administration.

Let us take the sovereignty of the State. For a Foreign Office appointment international law is one of the subjects mentioned in the Regulations of the Civil Service Commissioners. Though the staff of the Foreign Office need to be experts on the subject of Sovereign rights, the Post Office Administration is brought face to face with problems immediately related to it. It is a matter of importance to realise that Sovereign rights extend throughout the Empire. The high seas are free, but every small islet officially recognised as under the sovereignty of Great Britain is of a possible potential value, e.g., the linking up of an ocean cable. The doctrine of the "high seas" is revealed in a paragraph on page 84 of the Post Office Guide (October 1915).

"All persons on board British ships on the high seas are entitled to send their correspondence prepaid by means of British postage stamps."

The emphasis is on the idea of jurisdiction of the State over British ships upon the ocean, but the paragraph is intimately related to international problems. The control of the littoral is seen in the question of so-called "landing rights." The subject is repeatedly referred to in the report of the Inter-Departmental Committee on Cable Companies (1902). At page 24 of the report we read: "But by far the most powerful lever which the State can employ in dealing with the Cable Companies is the power to grant or withhold landing rights."

The Wireless Telegraphy Act, 1904, indicates the extent of sovereignty from another point of view. Under Section 3, Clauses 2, 3 and 4, Great Britain claims dominion over "all British ships in the territorial waters abutting on the coast of the British Islands." His Majesty in Council may order that the Act shall, subject to any conditions, exceptions and qualifications contained in the order, apply the continuance of the order to British ships whilst on the high seas. No person is allowed, without the authority of the Postmaster-General, to work any apparatus for wireless telegraphy installed on a foreign ship whilst that ship is in territorial waters. It will be observed that Clause 2 contains the words the territorial waters abutting, &c.: the sovereignty is not limited to the three mile rule. The distinction is very important, and has given rise to much controversy, but this is not the place to study the problem.

While our attention is drawn to this principle of international law we should perhaps go one step further in the same direction and allude to ex-territoriality. This is easily understood when we take cognizance of the presence of the Foreign Embassies in our midst. The importance of the rule is accentuated when the sovereign representative of a Foreign State lands upon the shores of Great Britain. The Telegraph Administration knows that special facilities must be afforded. The finance side has duties to perform, not only on occasion of special visits, but in the conduct of the ordinary business of the legations. According to the custom of nations the bearers of despatches have the privilege of inviolability. They must be duly accredited representatives or, like the unauthorised American correspondent, the courier will find the despatches are liable to confiscation. The unlawful conveyance of postal packets between Great Britain and the Continent during the present war, has been disastrous to the persons found guilty of the crime.

The rule as to ex-territoriality is apparent when we turn to the 1915-16 Estimates. Public expenditure is incurred in the maintenance of British Postal Agencies in China, and districts where sovereignty is not recognised in international law. China is not yet a sovereign State. The British Agencies are enumerated in the list of countries of destination of the "Foreign and Colonial Mails," and the "Foreign and Colonial Parcel Post" shown towards the end of the Post Office Guide. In the Post Office Circular of Nov. 20, 1915, there was a very innocent looking announcement. It declared that two British Agencies in Morocco had been closed, and that henceforth the postage on letters must be at the international rate. Nothing important may have happened, but the change might be associated with an international agreement between Great Britain and France in the same manner as the status of Egypt has altered since the beginning of the war. British Post Office Agencies were once established in Japan. But the Postmaster-General's Report for 1879-80 mentions the withdrawal of the agencies, and the conduct of business henceforth restricted to the staff of the Japanese Post Office. Japan was admitted to sovereign rights under the Treaty of 1899. Great Britain was the first to accede recognition.

One other reference to the theory of sovereignty must suffice. Under Section 4 of the Post Office Act, 1908—the great Consolidation Act to which, I believe, the late Sir Robert Hunter earnestly devoted himself—where an arrangement has, either before or after the passing of this Act, been made by His Majesty with any foreign State with respect to the conveyance by post of any postal packets between the British Islands or between places out of the British Islands whether through the British Islands or not, the Treasury may, by warrant, make such regulations as may to them be necessary for carrying the arrangement into effect, and may make provisions as to the charges for the transit of postal packets, single or in bulk, and the scale of weights to be adopted, and the accounting for and paying over to any foreign State of any money received by the Postmaster-General.

We will now pass on to consider briefly another permanent feature of the financial administration of the Post Office, viz., the international conferences. These periodical gatherings embrace four great departments of Post Office activities, Postal (including money orders, &c.), Parcel Post, Telegraphs, Radiotelegraphs. Seventeen conferences in all have taken place. They have chiefly been held on the Continent of Europe. One took place

* Paper read before the Telephone and Telegraph Society of London on Jan. 24, 1916.

at Washington. They cover an epoch of 41 years so far as concerns this country immediately. The foundation of the international postal system was laid in 1874 by the Convention of Bern. The fundamental principles of the international telegraph system date from the St. Petersburg (Petrograd) Convention of 1875. The consideration of an international parcel post system takes us back to the Paris Conference of 1889. The initiation of an international radiotelegraph service belongs to the year 1903 when delegates met at Berlin.

At first sight the four—or preferably three by regarding the Parcel Post as part of Postal—great departments appear to be entirely independent of one another. Different groups of delegates attended as representatives of their respective administrative departments. The minute detail of each department demanded this. Nevertheless the correlation of administration and finance is complete, and whether postal, telegraph or radiotelegraph the delegates belong to one or other of the two sides of financial administration, and all are intimately related by reason of the necessity for interchangeability.

The three great departments have, however, something in common in their relationship to international conceptions. Let us for a few moments examine one or two of the documents. The analysis must be in the direction of fundamental principles; it can only be of an elementary character.

- (1) All the conventions were "subject to ratification." As regards the Radiotelegraphic Convention of 1906 (Berlin) a Select Committee was appointed in this country to report what, from the point of view of national and public interests, would, in their opinion, be the effect of the adhesion or non-adhesion of this country to the convention.
- (2) Official correspondence relative to the Postal Service is exempt from postage; similarly telegrams relating to the international telegraph service are transmitted free. Article 17 of the Radiotelegraph Convention of 1906 makes provision for the application, *inter alia*, of Article II of the St. Petersburg Convention, 1875.
- (3) All the international services provide for a central office, the expenses of the institution to be borne by the contracting countries.
- (4) The conventions recognise the right of all persons to correspond.
- (5) All the services are subject to the right of transit; in the case of Radiotelegraph Convention, Article 5 provides that each of the high contracting parties shall cause its coast stations to be connected with the telegraph system.
- (6) All the conventions provide for periodical conferences.
- (7) The franc is the monetary unit in the composition of international tariffs.

From the point of view of differences the following may be mentioned as illustrations:—

Postal.

The general union rate of 25 centimes—with maximum weight of 15 grammes. The margin of difference in the conversion of money was fixed as a maximum change of 32 centimes and a minimum of 20 centimes.

Telegraphs.

The rate of charge to be fixed between State and State; a European State may be divided into two large territorial divisions, but not more. At the London Conference of 1880 the principle of a charge per word instead of per message was established.

Radiotelegraphs.

Coast charge not to exceed 60 centimes a word; a ship charge 40 centimes a word. The country on whose territory a coast station is established which serves as a medium for the exchange of radiotelegrams between a ship station and another country is considered for the purpose of applying the telegraph rates as the country of origin or of destination of those radiotelegrams and not as a country of transit.

Having established the right to send a postal packet to any part of the General Postal Union which forms a "single postal territory," to despatch a telegraphic communication to any one of the many thousand stations published in the Bern list, and to "exchange radiotelegrams" between coast stations and ship stations open for the service of public correspondence, most minute points of detail have been considered and recognised in the conduct of these systems of communication. But the foundations of the three systems of 1874, 1875, and 1906, respectively, remain as permanent features of Post Office administration.

I know that we regard our revised Post Office Guide with admiration. Its pages number nearly one thousand, and every conceivable service which the State Post Office is prepared to render is fully explained. But the three international documents which represent the beginnings of our organised relations with foreign States appear to me to stand out as epoch-making records. They are far removed in importance from ordinary transactions of postal business. The provision of a margin of difference in the exchange values shows how carefully the foundations were laid.

This is not the occasion to compare the work of succeeding conferences with the pioneer difficulties in drafting articles which would be acceptable, in principle, to all the contracting parties. The original treaties represent how far the signatories were authorised at that time to bind their country. I think we can safely say the establishment of the Telegraph Union paved the way for a more rapid development of every form of international service;

countries were brought into immediate relationships, and the needs, aspirations, and possibilities of the future became more insistent. Radiotelegraphic communication has come as a great move forward, and the potentialities of the telegraphs, radiotelegraphs and telephones are still beyond.

This division of our paper will be incomplete if no mention is made of the part played by private telegraph and cable companies, more particularly the latter, in the organisation of British and European and British and extra European systems. A glance at the authorised map of the world prepared by the Bern Office periodically is sufficient to indicate the extent of submarine communication. Regulation LXXXIII, paragraph 3, of the St. Petersburg Convention refers specifically to the "Companies whose lines link two or more of the contracting States together, at least to the extent that they may be bound by their Articles of Concession, to submit themselves, in this respect, to the conditions prescribed by the State which granted the concession."

Preparations for the international conferences are made many months in advance. Every State has the development of its own vital interests to consider, and the preliminary proposals and counter-proposals of the administrations circulated to the adhering States through the Bern Office require to be examined from every point of view. The correlation of public administration and finance is most marked in this respect. The proceedings at the conferences are, of course, confidential. The results are embodied in treaties which can be studied in the Hertsiel series. The separate treaties concluded between individual States are very numerous. The agreements concern more immediately two or more States, but do not relate to matters common to all the adherents of the conventions. For example, in the list of treaties we find an agreement with Switzerland respecting express parcels delivery dated 1897; a supplementary agreement regarding parcel post with the same State and on the same date, and so on. Some indication of the nature of the negotiations of the treaties is afforded us in connexion with the "Radiotelegraphic Convention signed at Berlin on Nov. 3, 1906," already referred to. The report of the Committee is a most interesting document. The whole subject of wireless telegraphy was discussed.

The international aspects of Post Office activities may perhaps conveniently be followed by one or two references to the all-important subject of Crown privileges in regard to the financial administration of the Department. These privileges, prerogatives, powers, stand apart from the international conceptions of the sovereignty of the State. "Sovereignty" is used in relation to the territorial property of a State. Crown privileges operate as great factors in the public life of this country. As a simple illustration of the existence of these privileges Section 79 (Clause 1) of the Post Office Act of 1908 may be cited:

No person shall demand any toll on the passing of any carriage or horse conveying mail bags at places where tolls are demanded. It can at once be seen how this principle affects administration as well as finance.

No time runs against the Crown. The Crown is entitled to priority in the collection of moneys due; the salaries of Crown officials, and the pensions of Crown officials who may be liable to render further effective service are safeguarded from certain points of view in regard to claims by private citizens. The Crown has exemption from parochial and other rates; as an act of grace the Treasury make contributions to local authorities. The Crown admits no liability for the consequences of the negligence of its servants. These silent powers of the Crown are considerable. Every now and again they reveal themselves in "cases" referred to in the Press. Though the Post Office "cases" may not be so frequently before the public the powers exist, and influence executive and financial action in the conduct of public business.

In close relationship with these considerations are the exclusive rights of the Postmaster-General (page 141 of the Post Office Guide):

"Subject to certain exceptions the Postmaster-General possesses the exclusive privilege of carrying letters from place to place," of transmitting telegrams within the United Kingdom. No person may establish a wireless telegraph station . . . except under licence, extended by Order in Council dated Feb. 29, 1908, to British ships on the high seas. And under the Defence of the Realm (Consolidation) Regulations, 1914, no person may, without the written permission of the Postmaster-General, buy, sell . . . any apparatus for the sending or receiving of messages by wireless telegraphy. . . .

At this juncture it may be opportune to allude to what is known as the Index to the Statutes *in force*. We are not as individuals immediately interested in legal procedure, but what lies beneath the words of Acts affecting the Post Office are study of some concern to all. Possibly it may astonish some that the statutes in force extend over so long a period. Postal Acts go back to 1822—it will be remembered that the Postmaster-General in his speech at the meeting of the Rowland Hill Benevolent Fund held at the Mansion House on Nov. 10 last said that Sir Rowland Hill's work of 1840 only just escaped destruction in connexion with the proposals embodied in the 1915 Act—Telegraph Acts to 1844. They lead up to the Consolidated Act of 1908. They deal with administration, postal regulations, conveyance of mails, money orders, revenue, offences and legal proceedings, conveyance financial arrangements, and many other details. That these Acts of Parliament have continued to be of real force is revealed in the Act of 1915. For 30 years the Act of 1885 fixing the statutory limits of the cost of a telegram, has been effective, and proposals to modify the limits demanded a reference in the 1915 Act to the earlier document. The alteration in the Press tariff required the citing of a much earlier Act, viz., the Act of 1868. It is easy to speak of Press rates, but the original statutory regulations in 1879, eleven

years after the paper type has at last been ordered, 1911 not to 1868, 1863 to 1911 have elapsed power to in Parcel Post not adhere service cost

These within the beneath the The purpo made a fe would con Acts, but Union. . . factor of I any service documents of what sh master mi refer back second rea published stand, tha the study bearing of The s peculiarly another. additional I have hen Telegraph As ar quote the written I from tim such othe for the pu but due i other ma The perin Gazette of viz., "Th the name action w administr At tl

referred s to the c telegraph specialist society in the r keeper, h I had, th to pass b relation For. tration a proposel to calu "disove Botl The list ready to Royal C make on allusions too far Civil Set precise Commis into the addresse Shim as follo C Wh whether servan their of on a den

years after the Act of 1868, effective until Dec. 31, 1916, look very faded: the paper is of a different texture to that manufactured to-day: even the type has an old-world appearance. The revision of the Statutory Rules and Orders, 1915, No. 1,041, respecting inland written telegrams, carry us back not to 1868, but to 1863. The Postmaster-General declares that the regulations are made by virtue of the power vested in him by the Telegraph Act, 1863 to 1915. The change in the parcel post rates reveal the fact that 32 years have elapsed since Parliament first decided to give the Postmaster-General power to introduce a Parcel Post service, the outcome of the International Parcel Post Convention of Paris held in 1880. The British delegates could not adhere to the convention at that time because the conditions of the service could not be carried out in this country.

These series of Acts of Parliament deal entirely with matters coming within the financial administration of the Post Office. They are somewhere beneath the surface of all formal rules and regulations of the Department. The purport of them is spread over the pages of the Post Office Guide. I have made a few quotations from that volume. Sometimes non-legal language would convey more easily the true meaning of the clauses and sections of the Acts, but the sphere of law is restricted we are told to a "very close Trade Union." I have ventured to attach great importance to this permanent factor of financial administration for two reasons: in the earlier years of my service I was taught the paramount importance of the study of original documents. On one occasion I innocently quoted a rule book as evidence of what should or should not be done. I was instantly taken to task by the master mind which was considering the problem, and informed that I must refer back to the actual clause containing the authority on the subject. The second reason I have for putting Acts of Parliament and Statutory Regulations published in the *London Gazette* under the Acts, in the forefront, is, I understand, that leading men of business in America are including in their training the study of legal principles in order that they may be fully cognizant of the bearing of law on commercial and industrial problems.

The study of the Acts of Parliament appertaining to the Post Office is peculiarly fascinating. The Acts reveal the intervals between one step and another. They indicate how difficulties presented themselves, and how additional power was required in the development of the Post Office system. I have here a rough summary covering the period 1868 to 1908 in the case of Telegraphs. Perhaps I may read it (omitted).

As an indication of how changes in regulations are made, perhaps I may quote the following instance. Under the Statutory Regulations (Inland written Telegrams) of 1898, Clause 24 (2) the "Postmaster-General may from time to time vary the rules specified in this regulation, and make such other rules with reference to the reckoning of the contents of telegrams for the purposes of the charges in respect thereof as may seem to him meet, but due notice of all rules shall be given in the *London Gazette* and in such other manner as the Postmaster-General may from time to time direct." The permission refers, I believe, only to the particular clause. In the *London Gazette* of May 2, 1913, appears a notice taking advantage of this permission, viz., "The names of districts in towns when used in addresses in addition to the names of thoroughfares, &c." This is a simple case of administrative action which had and still has a financial bearing on Post Office revenue: administration and finance are correlated.

At this point I had better deal with an apparent omission. I have not referred specifically to individual Departments, but have directed attention to the central idea of financial administration. The technical sides of telegraphy, telephones, engineering, stores, &c., have been considered by specialists. The Comptroller and Accountant-General has addressed the society from the point of view, more particularly, of recent developments in the region of engineering expenditure. Mr. Wylie, now principal book-keeper, has presented an exhaustive paper on the general subject of accounting. I had, therefore, either to choose another technical subject, or to endeavour to pass beyond and reach a point of view from which we might consider the relation of central questions to the organisation as a whole.

For example, I am perhaps at liberty to turn to the correlation of administration and finance in relation to the *personnel* of the Post Office. I do not propose to unfold questions relating to remuneration, to methods of payment, to calculations, to the theory of service scales, &c., &c. I want rather to "discover" wherein all these problems dwell.

Both effective and non-effective services claim some consideration. The historical data of the existing Civil Service is practically complete and ready to hand. The foundation year was 1853. The fourth report of the Royal Commissioners (1914) covers all the ground. Still there is room to make one or two suggestive remarks. Someone may have thought that my allusions to the Crown in relation to administration and finance were rather too far away to be of practical assistance. They are not, however, distant. In paragraph 3 of page 1 of the Report we read: "Your Majesty's permanent Civil Service is a clearly defined entity being the subject of a definition both precise and authoritative." Farther down on the same page the Commissioners declare they have "left to another body the task of inquiry into the special organisation of the General Post Office. The report is itself addressed to the King's Most Excellent Majesty.

Similarly the Civil Service Commissioners Annual Report commences as follows:—

May it please your Majesty. We, your Majesty's Civil Service Commissioners, humbly offer . . .

What underlies the Royal Commissioners' enquiry? I am not sure whether the meaning of service is fully realised. Civil servants appear to be servants from the same point of view as a great Minister of State. They hold their office at the pleasure of His Majesty. Until 1 Edward VII, cap. 5, on a demise of the Crown there was a proclamation to the effect that the holders

of offices were re-instated in their situations for a period of six months. There is no redress against the Crown. The principle accepted in 1855 was the admission to the Civil Service of any subject after "open competition." The principle is, of course, not entirely adhered to. It is not for me to examine the *pros* and *cons* why there are exemptions. In the general regulations of the Civil Service Commissioners would-be competitors are warned that examinations are "open to all natural-born or naturalised British subjects." This clause has had greater significance since August 1914, and its meaning is now perhaps better understood than formerly. The Commissioners have also had special regard to the question of limits of age and health. The age problem has evidently given rise to many reflections. For example, it appears to be generally accepted that severe open competition should not be insisted upon after the age of 24. The ordinary channels of admittance into the Civil Service cease after that age.

The successive Orders in Council are of special interest. They are not of absolute application—I think I am right in stating this. They represent broad generalisations for the control of the Civil Service. In one of the reprints of the Orders, parts which had been repealed were shown in italics and indicated the action taken to provide for new conditions. The Orders were consolidated in 1910.

That these features of the service are of a permanent character and are constantly before the experts on both sides of the financial administration, is well known. If we extend the scope of the inquiry so as to include the general organisation of the Post Office we find how considerable is this problem of the establishment. At first sight it might be thought that the purpose of the Post Office, its vast interests in many directions, would occupy the greater part of the time and thought of the administration. The principle of introspection has, however, been developed in the Post Office on a large scale. The enumeration of even the names of the Committees is formidable. There is now practically a library of volumes containing evidence and reports.

I suppose it will be right to say that nearly every detail of work, when, where and how it is performed has now been tabulated: that every point connected with the status of the individual—the conditions of his service—has been a matter of consideration: that every question as to aids to sustained and constant efficiency has been examined. Sometimes the relations of the service with the outside world of commerce are referred to. The general conclusion appears to be the Civil Service cannot be compared exactly with commercial and industrial organisations. The Royal Commissioners devote several paragraphs to the subject. They include the General Post Office in the short list of Government Departments to which the "commercial criteria of the successful conduct of business transactions may to some extent be applied." But they proceed to state that much of what is "commonly described as 'red tape' is due to the exigencies of Parliamentary Government, much of the delay and expense of public departments should in truth be regarded as part of the price paid for the advantages of public discussion and criticism of public affairs."

But I should like to intrude a word or two here. Notwithstanding what has already been said I sometimes think the conception of service is capable of enlargement in one direction particularly. The Civil Service has splendid traditions, the strongest incentives to loyalty and devotion exist on every hand, and the honour of the Service is precious to all. Still, in spite of everything—and I am only thinking of a possibility—does the service—the actual rendering of service—include a real, permanent interest in the industrial and commercial "life" of the country. I interpose the question as a line of thought, and may have occasion indirectly to refer to the point again.

I must not omit the non-effective side of the establishment. Having entered the Civil Service every one present is personally concerned with the continuity of his service when he cannot actively take part in the work of the Post Office. The non-effective side has been a matter of repeated legislation in like manner as appointments to His Majesty's service have called for periodical alterations expressed through Orders in Council. His Majesty may appoint: His Majesty with the advice and consent of Parliament controls the effective and non-effective expenditure. Pensions for all practical purposes are controlled by the series of Acts passed since 1834. The early Acts are as real as more recent enactments. Replying to a question in the House of Commons recently the Financial Secretary to the Treasury stated that the payment of pension to a retired Civil Servant upon re-employment is governed by the provisions of Section 20 of the Superannuation Act of 1834. Every one hopes that when his time for retirement arrives he will have a duly and authoritatively signed certificate that he has served the Crown with "diligence and fidelity to the satisfaction of his superior officers." The idea of service is surely brought near to us by this means, though the outward display of a medal for "faithful" service is restricted. The words of the certificate are contained in Clause VIII of the Act of 1859. Clause 10 of the same Act conveys the idea of how long a period the service should extend as a minimum, and safeguards indifferent regard to the rightful claims of the service. The clause declares it shall not be lawful to grant any superannuation allowance to any person who shall be under 60 years, unless upon medical certificate to the satisfaction of the Commissioners of the Treasury that he is incapable from infirmity of mind or body, to discharge the duties of his situation, and that such infirmity is likely to be permanent.

The association of these principles to permanent officers of the Crown is alluded to in a report of the Public Accounts Committee (page 33, Vol. III of Handbook):

"No authoritative definition of what constitutes a permanent Civil Servant is known to the Treasury. A partial definition of the term may, indeed, be extracted from the provisions of the Superannuation Act, 1859: and as concerned with them, a permanent Civil Servant would appear to be an officer appointed by the Crown,

or holding a certificate from the Civil Service Commissioners, giving his whole time to the public service, remunerated out of the Consolidated Fund, or out of the moneys voted by Parliament, and liable to retirement or removal; therefore, holding only at pleasure and not during good behaviour. . . ."

The same document contains the expression of opinion:

"It should, further, be noted that although it is incumbent on the Treasury, as the office primarily responsible for the regulation and conduct of the Civil Service, to issue directions giving administrative effect to Statutes and Orders in Council affecting Civil Servants, the Treasury does not claim to be a final and conclusive interpreter of the law which it puts in action."

The only other permanent factor I would recommend to your notice as a subject for study is the revolution effected in financial administration by the passing of the Exchequer and Audit Act of 1866. Within the next six years the Lords of the Treasury decided on their future course of action in regard to their "agents" and the control of public money. I will quote one paragraph from the Treasury Minute of Aug. 14, 1872:

"It will be remembered that the Exchequer and Audit Act which became law on June 2, 1866, was intended to come into operation on April 1, 1867. The amount of labour, however, connected with the entire remodelling of the estimates and accounts of the Civil Service, and to some extent of the Military and Naval Services, and the arrangements necessary to reduce them into working order proved so great that it was quite impossible to bring the Act into full operation at the prescribed date. It was, indeed, only on April 1, 1868, that every branch of the Imperial service became actually subject to its provisions; and for a long time subsequent to that date the Public Accounts Commissioners were continuously employed in working out the balances which would form the basis of the audit ordered to commence as from the date mentioned."

This extract is taken from the Handbook to Reports from Committee of Public Accounts 1911. In the preface the Comptroller and Auditor-General mentions that the volume comprises "all the matter of permanent interest contained in the Reports of the Committees and the Treasury Minutes thereon, since 1857." He goes on to say that "it has been his aim to include:

- (1) All recommendations on question of principle affecting accounts, generally, if still in force.
- (2) Recommendations afterwards amplified or amended, only when it seemed desirable to illustrate the historical development of a principle.
- (3) Recommendations relating to particular accounts, only when necessary to explain the form or contents of the current estimates or accounts."

The ordinary handbooks of the Comptroller and Auditor-General are issued periodically.

We have now passed under review the chief permanent factors of Post Office Administration and Finance. These factors are, as I have said, everywhere present. They enter recognised or unrecognised into every comprehensive subject of discussion. Isolated and apparently insignificant "cases" have some relationship with these fundamental principles. It matters not whether the "case" originates in an obscure village in Cornwall in the South, or at a busy centre in Northumberland in the North: beyond the Tweed, across the Irish Sea, in the Isle of Man or the Channel Islands they operate though their application may be provided for by special clauses in Parliamentary documents. In the international conception of the whole subject there is no distinction.

Besides permanent factors some attention should perhaps be given to what may be called

"Temporary" Factors in Public Administration and Finance.

They may be classified as of minor importance, of considerable magnitude, of far-reaching significance, of periodical character. Here we seek the episodes in the "life" of the Post Office. Quite close to them in time they may appear to be of surpassing interest. As time passes their disturbing influence becomes less felt until, like the great wars of the past, they are scarcely observable. While the events are current the strain upon the principal agents may be immense, almost overwhelming, and the attainment of the end desired a great triumph.

From this standpoint the date, the occasion of the first occupation of one of the modern group of buildings which form St. Martin's le Grand is of minor importance. Much is revealed by the construction of these public offices, and the fact that the military authorities are guarding them at this hour helps to remind us that we are at the centre of the Empire. But the transition from one building to another is of the day.

Perhaps the purchase by the State of the National Telephone Company's system of trunk lines must be given a higher place in the list of comparatives.

Higher still, though this is a matter of opinion, were the negotiations entered into during 1884 and the next five years for the acquisition, in conjunction with the administrations of Germany, France, Holland and Belgium, of the cables owned by the Submarine Telegraph Company and connecting this country with the Continent of Europe. The purchase of the cables was carried out in 1889.

The recent purchase of the National Telephone Company was a much larger, yet still, I venture to submit, only a temporary factor. Looked at as a commercial undertaking and compared with other enterprises controlled by private persons the transaction was of the first magnitude. At least, it

appeared so at the time. All our ideas of magnitude have, however, undergone a change since Aug. 4, 1914. £12,000,000 is an insignificant sum when we think of the nation's expenditure on the war reaching a figure not far short of £5,000,000 a day. How silently and rapidly has the commercial enterprise passed into the activities of the State, and the episode become almost wholly a matter of history.

Under the heading "Temporary" I am inclined to place "those borrowing powers conferred by Parliament" since 1892. The loans were raised by the National Debt Commissioners; they are redeemable by terminable annuities; they represent spending public money on particular objects. The right appropriation of these moneys gave rise to many serious questions in regard to policy, contracts, staff, apportionment. All sections of financial administration were concerned, and perhaps the Comptroller and Auditor-General by no means the least. The difficulties of presenting the financial statements in "commercial" form were fully set out by the Comptroller and Accountant-General.

As an illustration of factors of a periodical character mention must be made of the preparation of the estimates annually. There is great activity in this connexion during the last quarter of the calendar year. Every item of expenditure included in the total of £26,800,000 (1915-16) is reviewed, and I recall to mind the remark of an authority on finance that he was astonished at the accuracy with which the estimates were framed. With the passing of the final proof—every figure of which is of vital interest—and unless, at the last moment other Parliamentary proposals affect the totals—the estimates "pass," and ere long the work of the principal bookkeeper begins and does not finally end until the last days of the November in the following year but one.

Day to day Correlation of Public Administration and Finance.

This is a stage removed from the great episodes of the past. In the earlier part of the address emphasis was laid on correlation on a large scale in regard to laying down fundamental principles, to the closest unity of action in preparing the way for executive measures, to the adoption of considered policy. This section must be devoted to "current business," business over and above the work involved in Sections 1 and 2.

How does day to day correlation arise? What does it mean? Suppose it were possible to enumerate every class of "case" under consideration on any one day, how many subjects should we have? There is no need to press for an answer, but the enunciation of the idea is sufficient for my purpose; the number is legion. Let us ask another question. What is the key to the financial administration of the Post Office? I think we shall find that intercourse is at the basis of Post Office activities. Intercourse gives rise to a thousand problems in relation to the expansion of one service, to the contraction of another, to the adoption of alternative services, the partial use of possibly three services. Intercourse may be subdivided into trading and non-trading. It primarily has importance in local areas, the larger urban districts, the great cities; it exists between individuals in different parts of the United Kingdom; the principle extends to the dominions beyond the seas, and, until the outbreak of the war, in a greater degree to individuals on foreign territory. The intercourse may take the form of written communications in sealed or open packets—telegraphic messages—telephonic conversations—the transmission of articles of value—despatching of larger packets as parcels—the exchange of monetary documents. The tendency is for the intercourse to increase and touch the farthest points of civilisation, and beyond civilisation. From this point of view the annual report of the activities of the Post Office is of living interest, and the results of day to day—April 1 to March 31 of each financial year—administration are tabulated and valued. There is no complete collective summary of the activities of the Post Office in relation to foreign States. If there were time I think it would be of interest to see what variations exist in the number and value of the different classes of transactions during the year. Another helpful subsidiary study is an examination e.g. of the frequency of the "lines of communications" between the mainland of Great Britain and Ireland, and the isles of the surrounding seas. I may not be quoting the very latest standard time, but here is an interesting item. By means of the correlation of administration and finance a Home Packet Service has been arranged so exactly that the time on outward journeys (including transfer on both sides of the Channel) between Holyhead and Kingstown is fixed at 3 hours 37 minutes night service, and 3 hours 22 minutes day service. Time on inward journeys (including transfer) 3 hours 32 minutes night service, and 3 hours 17 minutes day service. Turning over the pages of the report we find a service between Shetland (Walls) and Foula; its frequency is once a fortnight (October to March); once a week (April to September). A page or two farther on we have the services to places outside the United Kingdom. Like as the Berne official map shows the international and submarine telegraph lines it would be instructive to place on the same chart the lines of communication for the conveyance of mails. The routes to Australia, alone, point to the constant correlation of administration and finance. On page 712 of the Post Office Guide we find Australia is reached via France and P. & O. line, via France and Orient line, by sea direct, via San Francisco and via Vancouver. The dates of despatch and arrival of Foreign and Colonial mails and parcel post, &c., take up no less than 144 pages of the Post Office Guide. Though it is not part of my duty to speak of sea power the safety, due departure, and arrival of mails, is a matter of supreme importance to the nation.

From an interior point of view I submit for consideration the Post Office financial problems arising out of the customs, the more or less permanent factors of our English life. I think the central point in the calendar year is the August Bank Holiday, and its immediate association with the vacation

Gell Telegraphic Appliances Syndicate, Limited.

ON WAR OFFICE, ADMIRALTY, POST OFFICE, CROWN
AGENTS, AND OTHER COLONIAL ADMINISTRATIONS
LISTS OF CONTRACTORS.

SOLE MANUFACTURERS OF THE

GELL KEYBOARD PERFORATOR.

GELL Motor - Driven Transmitter.

GELL Motor - Driven Receiver

for Morse and Cable Wheatstone working.

Also Manufacturers of

**LANDLINE, CABLE AND WIRELESS
TELEGRAPHIC APPARATUS.**

Registered Offices:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Sardinia House, Sardinia Street, Kingsway, W.C.
Telephone: Holborn 6826.

Works:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Pine Grove Works, Tollington Park, London, N.
Telephone: North 1196. Telegrams: "Gelltas, London."

EBONITE.

TONS of SHEET, ROD and TUBING in London
Stock in various Qualities and numerous Sizes.

EBONITE-VULCANITE owing to its special nature,
can only be made successfully after many years of experience.

We have been manufacturing this Material for
OVER 60 YEARS.

AMERICAN HARD RUBBER CO.,

13a, FORE STREET, LONDON, E.C.

"EBONISETH, LONDON."

CENTRAL 12754

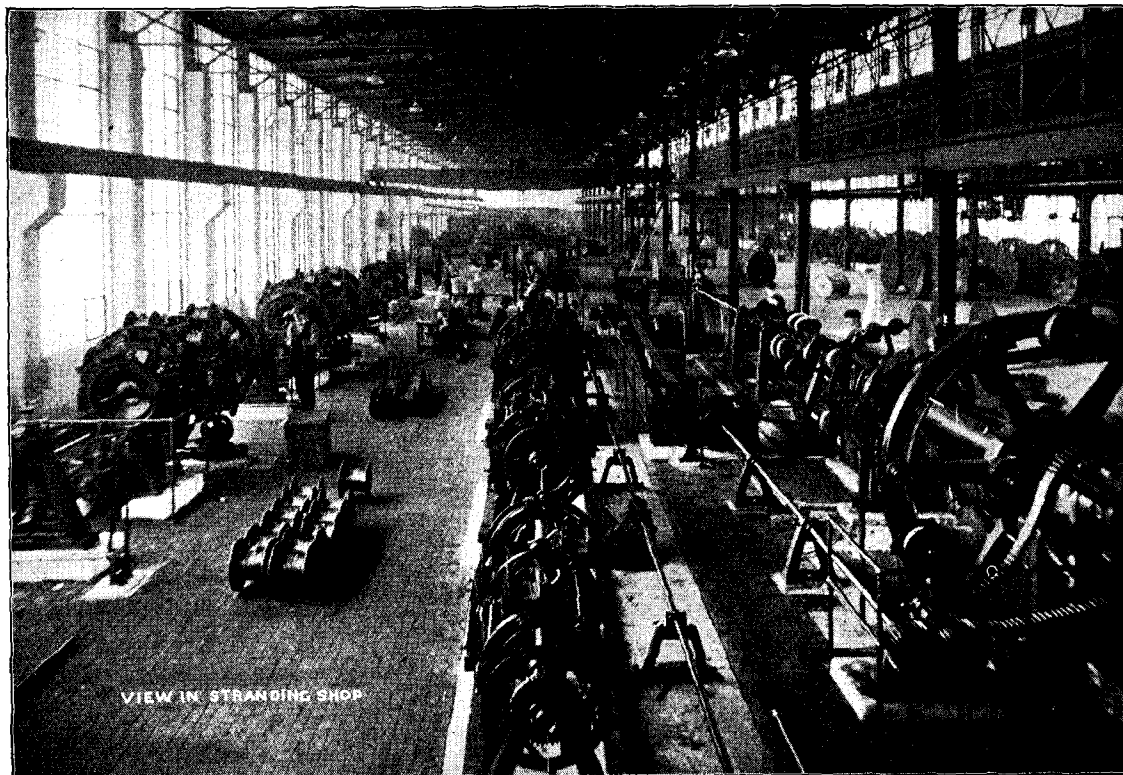
Head Office: 9-13, MERCER STREET, NEW YORK, U.S.A.

Factories: Akron, Ohio. Butler, New Jersey. College Point, New York.

Silk and Cotton-Covered H.C. Copper Wire,
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
"ORMISTON, LONDON." 13259 CENTRAL.

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.
HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital). Telephone: 1309 LONDON WALL.
HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.
HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3S. 6D. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

	PER PAIR
Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses	3 6
Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames	7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE, WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

THE

Telephone Rendered Audible under Gunfire

BY THE USE OF

MALLOCK-ARMSTRONG Patent EAR DEFENDERS.

(Mr. A. Mallock, F.R.S.—Sir W. G. Armstrong, Whitworth & Co. Ltd.).

SMALL SOUNDS ARE PRESERVED.

WHEN WEARING THE DEFENDER THERE IS:—
NO TEMPORARY DEAFNESS, NO LOST TIME,
NO MISUNDERSTANDING.

IT IS WORN IN COMFORT UNDER THE RECEIVER OR GAS HELMET.
CONSTRUCTED ON ACOUSTIC PRINCIPLES.



Supplied to every Ship in H.B.M. Navy.



Involves no inconvenience to the wearer.

Remove the Defenders from the Clips and place one in each ear.

In Metal Pocket Case with "Safe-fine" Rubber Clips, as illustrated,

4s.

Per Pair.

Post Free.

4s. 2d.

with full particulars.

Many thousands already in use in the firing line.

Indestructible.

From Stores, Outfitters and Surgical Instrument Makers, or from:—

MALLOCK-ARMSTRONG EAR DEFENDER CO.,

FACTORY: 5 CARTARET STREET, WESTMINSTER.

VOLUME III.
THE

CABLE PLANT

By A. V. A. ABBOTT,

Chief Engineer, Chicago Telephone Co.

153 pp., 5 x 8, 52 ill. Price 6/3 net.

CHAPTER I.—The Principles of Circuit Design. II.—Mechanical Properties. III.—Installation. IV.—The Question of Electrolysis. V.—Cost of Cable Wire Plant. VI.—The Construction of Cable Plant.

AMERICAN ELECTRICIANS' HANDBOOK.

BY TERRELL CROFT.

Over 500 pp., pocket size, flexible leather, full gilt. Price 12/6 net.

THERE ARE SIX MAIN SECTIONS:—

- I.—FUNDAMENTALS.—A reference section on principles of electricity and electrical engineering.
- II.—GENERATORS AND MOTORS.—Characteristics and Management—Troubles and Remedies—Direct and Alternating Current Machinery—Starting and Controlling Devices—Installation.
- III.—DISTRIBUTION.—Pole lines—Underground Conduits—Transformers—Design of Systems, &c.
- IV.—INSIDE WIRING.—Every detail for all kinds of wiring, including old buildings, mines, signs, &c.
- V.—TRANSFORMERS.—Connections—Operation—Types—Special Forms—Installation.
- VI.—ILLUMINATION.—Interior and Street—Types of Lamps—Design—Installation, &c., &c.

STANDARD TELEPHONE WIRING,

BY J. F. FAIRMAN.

Leather. 91 pages, 4 x 6, 74 illustrations. 4/2 net.

HAVE YOU SEEN OUR CATALOGUE TT?

Hill Publishing Co. Ltd. 6 & 8, Bouverie Street, LONDON, E.C.

NEW & RECENT BOOKS

In "THE ELECTRICIAN" SERIES of Standard Electrical Works.

WIRELESS TELEGRAPHY AND TELEPHONY: A HANDBOOK OF FORMULAE, DATA AND INFORMATION. By W. H. ECCLES, D.Sc. Now ready. 12s. 6d. nett, post free 13s.

COMMON BATTERY TELEPHONY SIMPLIFIED. By W. ATKINS. New Edition. 3s. nett, post free 3s. 6d.

THE PRINCIPLES OF AUTOMATIC TELEPHONY. By WALTER ATKINS. 2s. nett, post free 2s. 2d.

AMATEUR WIRELESS TELEGRAPH DESIGNS. By "ALFREC." New Edition. 2s. 6d. nett, post free 2s. 9d.

LOCALISATION OF FAULTS IN ELECTRIC LIGHT MAINS. By F. C. RAPHAEL, M.I.E.E. New and Revised Edition. JUST PUBLISHED. 8s. 6d. nett, post free 9s.

ELECTRIC SWITCH AND CONTROLLING GEAR. By C. C. GARRARD, Ph.D., M.I.E.E. Nearly ready. 15s. nett, post free 15s. 6d.

STUDENTS' GUIDE TO SUBMARINE CABLE TESTING. By H. K. C. FISHER and J. C. H. DARBY. Fifth Edition. 7s. 6d. nett, post free 8s.

THE THEORY OF THE SUBMARINE CABLE. By H. W. MALCOLM, D.Sc. Nearly ready.

PRIMARY BATTERIES: THEIR CONSTRUCTION AND USE. By W. R. COOPER, M.A., B.Sc. New Edition nearly ready.

"THE ELECTRICIAN" ELECTRICAL TRADES DIRECTORY AND HANDBOOK. 34th (1916) Edition now ready. 15s. nett, post free 15s. 9d.; abroad 17s. 6d.

This work of over 2,000 pages has been carefully revised to mid-February, 1916, and, in addition to the Directory Sections, it contains many electro-technical Tables, a Digest of the Law of Electric Lighting and Traction, the Board of Trade and Home Office Rules as to the supply and use of Electrical Energy, Wiring and Fire Risk Rules (British and Foreign), &c., &c.

"THE ELECTRICIAN,"

THE OLDEST AND BEST WEEKLY ELECTRICAL JOURNAL.

Every Friday, price 6d., Post free 7d.

Full catalogue of books will be sent (post free) on application to

"THE ELECTRICIAN" PRINTING & PUBLISHING COMPANY, LIMITED,
1, 2 & 3, SALISBURY COURT, FLEET STREET, LONDON, E.C.

permitted to all classes of students, particularly the more youthful. The activities of the Post Office are centred here. There is no doubt this is so in connexion with inland telegraphic communications, and the highest point in foreign telegraphic traffic is reached during October. Of course, I shall be told that the greatest part of the Postal revenue is derived from the English custom of keeping Christmas. I speak not from exact knowledge, but I have ventured to assert that the profits of the Post Office would dwindle down to vanishing point if Christmas, and all that it means to commerce and industry months before, were to become a festival only of the past.

Our special purpose is, however, financial administration, considered somewhat apart from the effects of administrative action, and before I leave "day to day" correlation I ask permission to allude to one or two points which I hope will be regarded as free from unbecoming criticism.

(1) I acknowledge the value of accurate statistics. They are the very breath of business the other side of the Atlantic. The telephone specialists keep the subject in the forefront. As a whole I am of opinion that the preparation and use of statistics has not reached its highest point. For example, is there no danger that the figures, the tabulations, the measurements, as they are called, may remain cold and lifeless if the investigator has no appreciation of what the figures represent? I was much struck by the skill with which Mr. Tyrrell, of the Central Telegraph Office, interwove his discussion of the Baudot system, as introduced into India, with illuminative details of native life in that great peninsula. Do we study sufficiently the effect on the statistics of Post Office activities of the different geographical features of the United Kingdom? What difference does it make to Post Office revenue and expenditure by reason of the continuous chain of hills passing down the centre of northern England? Apparently the junior students of Post Office institutes are being prepared for a truer comprehension of regional geography, and in time the work of Professor Mackinder of the School of Economics will familiarise us with the import of the natural features of the country, and the existence of different "wants" will be perceived as something more important than the tabulation of figures.

(2) May any observations be made respecting methods of financial administration. One great advance was the introduction of the *précis* system. But have we even now devised the shortest means of reaching our goal? I quite admit that the constant review of a subject, large or small, is of the greatest advantage. The files of documents extending over perhaps 20 or 30 years all contain facts to be borne in mind—I am not thinking of the permanent or temporary factors which formed the more important portions of my address—but can we be sure that all the facts are there? Can they be isolated? Are they readily accessible?

I feel that scientific organisation demands some means whereby the progressive development of every subject should be instantly available. Not a collection of papers, not files of incidents of the moment, not files which derive their importance from the initial number registered upon them, not simply records of decisions, but something in line with the methods of records of scientific societies who add chronologically each contribution to the list, and everyone can trace precisely what has happened.

Without this procedure there is danger that a decision may have outlived its time, an estimate or measurement may be used belonging to wholly different phenomena, a vital point may be missed by the accidental withdrawal of a file of papers or the omission, through no one's fault, of the correlation of two sets of papers dealt with by two different sections of a department but as entirely separate and distinct developments, though intimately connected as regards fundamental principles.

Perhaps you will bear with me while I mention one or two personal reminiscences respecting many years' study of organisation. For example, we had a chronological list of every Treasury letter dealing with the establishment of the Accountant-General's Department. We always knew exactly where we stood. Similarly every Order in Council was closely studied the moment it appeared, and the exact bearing of every important point set out for future developments. So also, in regard to pensions, every important point of principle was extracted and studied as to possible eventualities. Every piece of information was there in its place.

(3) The question of training. I know that the general opinion of scholars is in favour of the severest mental training carried on beyond the ordinary years of school life, is the best preparation for public life. On the other hand the highest technical training is said to require an apprenticeship commencing at a comparatively early age. The point I want to insist on is that all the great problems of financial administration, affecting all branches of the public service, have to be mastered by officers whose preparation has been spasmodic and perhaps haphazard. The highly trained officer, however the training has been acquired, must start *de novo* to grapple with problems on comprehensive lines, and while his criticism may be destructive in character, it must include the more difficult achievement, *viz.*, constructive power. But how many months—in fact how many years may be, and often are spent under present conditions—and I do not venture a solution of this type of problem—in getting a grip of essential principles and collecting the available data so as to form readily a sound judgment. I regard this as independent of the ascertainment of the facts. That is after all the preliminary part only of study. The facts are the evidence, but the consideration of the data in relation to public affairs generally is quite a different matter. The importance of training arises from another factor—the staff must be interchangeable. As I have imperfectly shown the range of financial administration keeps extending, the conception of public business is always enlarging, the ramifications of the Post Office systems in the area of other State and municipal activities extend from year to year. All the time financial

administration is such that an officer may, at a moment's notice, be called upon to take up new responsibilities in other spheres of thought.

(4) A word as to pure research. In every department of science research work is being carried on. Until recently the State devoted but little attention to the subject. Research has been rendered possible chiefly through the magnanimity of private citizens. We see the process of research operating on a small scale in relation to the Awards Committee of the Post Office. Committee work partakes of the nature of research, but I venture to think the investigations are chiefly concerned with known complexities of public business. Individual officers of the department seize upon a subject now and again, and produce an exhaustive memorandum on the lines of historical analysis. Pure research seems to be something apart from these. I mean the research student is not only working in the "unknown" of the present, but he is trying to put himself into the future so that when the future becomes the present, everything shall be ready for applied science and based on fundamental principles. This class of work does not favour the introduction of schemes hurriedly put together in a time of tumult; it means that the certainty of the future shall be settled now in the quiet of the laboratory and on comprehensive lines. I shall be told that such research or development is already a part of the normal extension of telephones, but I am thinking of the possible and probable eventualities in financial administration generally.

In this connexion I would draw attention to a very striking prefatory essay by Professor Karl Pearson on the "Function of Science in the Modern State," which fronts the Vol. XXXII of the *Encyclopedia Britannica*. I wonder whether while we read the following extract we can think of the Post Office as an interested party, as having an equally keen interest in developments: "Especially, owing to the rapidly altering, ever contracting and developing processes of commerce, will it be needful for the teacher to keep in touch with current progress and methods. Nor can a man rear men to be pioneers unless he has done pioneering work himself. It is a big task which the Commercial University sets before itself, full of difficulties and possibly pitfalls, but one of essential national importance to-day. When our commercial leadership has been more than threatened, we have to rear a new type of worker who will see in trade not only a source of individual profit, but a patriotic duty. Developing commerce on the Yangtse, or struggling against fever in West Africa, or starting new enterprises in the Argentine, the trader must realise the relation of his efforts and those of his colleagues to thousands of handworkers at home, whose bread must come from over the sea by exchange. He must recognise that on his intelligence, on his linguistic and local knowledge, on his readiness to adapt goods and transit to environment, depends, to a far larger extent than has been dreamt of in the past, the national fitness to survive." This vision of things can surely be associated with the growth and development of the Post Office.

Outside the consideration of permanent, temporary, day to day factors in the financial administration of the Post Office are many extraneous problems continuously demanding attention. I will mention only a few; for example, bank notes, treasury notes, bills of exchange, valuation and destruction of spoilt stamps, manufacture of stamps, purchase of lands, contracts of all kinds, criminal law investigations, workmen's compensation, and so on. There are also, *e.g.*, direct relations with the National Debt Commissioners, the Inland Revenue Department, the War Office, the Admiralty, municipal authorities, railway companies, the principal banking institutions of the country, &c., &c. These auxiliary matters may not come prominently under notice, but they are all features of the financial administration of the Post Office.

Thus we draw naturally to the close of our brief survey of the correlation of public administration and finance.

We have tried to "discover" the Post Office, what that two hundred and fifty year institution means, where it stands in relation to the sovereignty of the State, to the international agreements which form the basis of our intercourse with foreign States, to the privileges, the prerogatives of the Crown, to the expressions of the will of Parliaments in the Acts passed from time to time and still in force, to the comprehensive manner in which the Civil Service and the special organisation of the Post Office, are the subjects of Treasury control through Orders in Council and Parliamentary Revisions, and to matters subsidiary to these fundamental considerations. We find that fresh activities enter almost daily into the life of the Post Office. What is comprehended under the title of Post Office is far beyond the work of ten years ago. The complexity of things increases.

In conclusion, what shall we say of the future, that future which imperceptibly becomes the present before we have time to detach ourselves and see what has happened. The site on the eastern side of St. Martin's le Grand is vacant. Some day a new structure will appear. The architecture will not be quite the same as the old General Post Office. The imaginative power of the architect will, however, help us to realise ideas of proportion, of dignity, of magnitude, and I am sure a fitness to one of the finest sites in the City of London, the centre of the Empire. Likewise, while we associate ourselves with the traditions of the architecture of public business can we imagine, for the moment, the passing away of those customs, methods, and the entering upon an entirely new phase of things, a new life. If so, will it not be that the architecture of the business of the Post Office will be more nobly conceived, that degrees of magnitude undreamt of before the war will be reached, that the Post Office, with its wonderful past, will take to itself yet more activities and deal with more and greater financial interests. The omens are that the British Postal, Telegraph, and Telephone Administrations, including in that description all branches of the one great Department, will rise to what is required, and continue to be collectively one of the greatest, if not the greatest, in the family of nations.



GROUP FROM THE CAST OF THE "MYSTIC MIRROR," LEEDS, MARCH 7 (see p. 165).

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

Transfers—

Miss E. NURSE has been transferred from London Wall Exchange to Hop, and her place at London Wall has been taken by Miss FORGE from the Hop Exchange.

Miss RUBY COX has been transferred from Stratford to London Wall.

Miss E. ELLIOTT has been transferred from Finchley to Hornsey Exchange.

Miss LAYTHORP has been transferred from Kensington to Western.

Miss VERNON has been transferred from Western to East.

Miss K. HOWARD, of East, has been transferred to the Savings Bank Department.

Resignations—

Miss PRING, the Chief Supervisor of Regent Exchange, has resigned on account of her approaching marriage. She received many presents from the staff, among which are included a silver tea set and candlesticks.

Miss C. M. GRIGG, Assistant Supervisor, Class II, of City Exchange, has resigned in view of her approaching marriage, and was presented with a silver tea set and other gifts.

Miss B. LEWIS, a Private Branch Exchange Telephonist attached to London Wall Exchange, has resigned on account of marriage.

Miss DOROTHY L. PEACOCK, of Dalston, has resigned on account of her approaching marriage, and was presented by the staff with a rose bowl.

Miss A. K. M. JACKSON, of East Exchange, has resigned.

Miss A. JELLEY, of East Exchange, has resigned.

Miss A. L. BUTCHER, of East Exchange, has resigned.

Miss V. REAY, of East, has resigned.

Miss A. SCARFE, Assistant Supervisor, Class II, of Avenue Exchange, has resigned on account of her approaching marriage.

Miss E. E. CRAVEN, of Avenue, has resigned to be married.

Miss E. M. FITCH, of Avenue, has resigned to be married.

Miss A. F. GOSNEY, of Avenue Exchange, has resigned.

Miss E. LAING, of Avenue, has resigned.

Miss A. SILVERMAN, of Avenue, has resigned.

Miss M. JORDAN, of Avenue, has resigned.

Miss C. L. HISLOP, of Battersea Exchange, has resigned in view of her approaching marriage, and was presented by her colleagues with a tea service and several other useful gifts.

Miss L. E. CROCKETT, of Paddington Exchange, has resigned to be married, and was presented with a tea service and other useful gifts by the staff.

Miss D. OWEN, of Paddington Exchange, has resigned on account of her approaching marriage, and was presented with a dinner service and other useful gifts.

Miss A. MARPLE, of Mayfair Exchange, has resigned to be married, and was the recipient of many useful presents from the staff and personal friends, including a silver tea service.

Miss A. D. E. SWIFT, of Mayfair, has resigned.

Miss L. J. HARRIS, of Mayfair, has resigned.

Miss V. S. HEALY, of Mayfair, has resigned.

Miss H. HAWLEY, of Holborn Exchange, has resigned to be married, and was presented with a tea service by the staff.

Miss M. B. FORDHAM, of Holborn, has resigned in view of her approaching marriage, and was presented with a tea service by the staff.

Miss A. E. SMITH, of Holborn Exchange, has resigned to be married, and was presented with a tea service by the staff.

Miss A. E. F. ROWE, of the Trunk Exchange, has resigned in view of her approaching marriage, and was presented with a dinner service and numerous other gifts.

Miss A. M. WELCH, of the Trunk Exchange, has resigned, and was presented with a dinner service.

Miss TURNER, of Western Exchange, has resigned to be married, and was presented with a dinner service, salad bowl and servers, a silver cake basket and several other useful articles.

Miss MACNAMARA, of Western Exchange, was the recipient of several useful presents on resigning to be married. They include a dining-room clock and silver toast rack.

Miss E. TAYLOR, of Regent Exchange, has resigned in view of her approaching marriage, and was presented with a dinner service.

Miss E. BARNARD, of Regent Exchange, has resigned to be married, and was presented with fish knives and forks.

Miss DEAVIN, of Dartford Exchange, has resigned.

Miss M. C. MARTIN, of Dartford Exchange, was presented with a gold brooch on resigning.

Miss DRAKE, of Erith Exchange, has resigned.

Miss YOULL, of Greenwich, has resigned in view of her approaching marriage, and was presented by the staff with a set of pictures and some glass ware.

Miss A. M. MERCHANT, of City Exchange, has resigned to be married, and was presented with a clock and other gifts.

Miss M. SADLER, of Holborn, has resigned.

Miss L. M. A. HARRIS, of Holborn, has resigned.

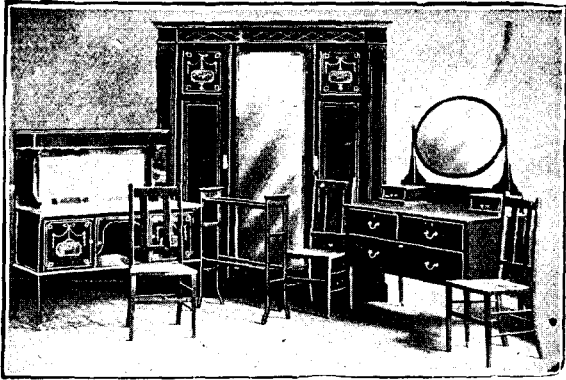
PROVINCIAL STAFF.

Mr. S. McFADDEN, Traffic Superintendent, Norwich, upon the occasion of his transfer to Bournemouth in a similar capacity, was presented with a handsome inlaid china cabinet, which was subscribed for by numerous colleagues and friends.

Miss D. E. BOOT, Telephonist, Nottingham Trunk Exchange, has been promoted to be Assistant Supervisor, Class II, Nottingham Trunk Exchange.

Miss ELSIE STUBBINGS, of Chelmsford Trunks, has resigned to be married to Sapper F. FROST, of this office. They were presented by the staff with cutlery, silver and other gifts.

Miss W. BUTCHER, of Chelmsford Trunks, has resigned.



Antique and Modern Furniture

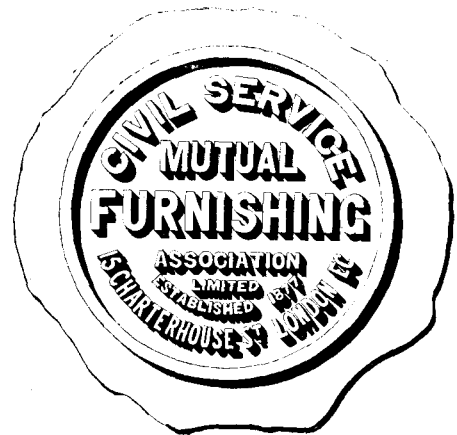
of Distinction and Durability

For CASH or EXTENDED PAYMENTS

can be obtained by

CIVIL SERVANTS

on the most advantageous terms from the



CIVIL SERVICE Share Purchase and Investment Society, Ltd.

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year.	2 Years.	3 Years.	5 Years.	7 Years.	10 Years.
17s. 5d.	9s. 1d.	6s. 3d.	4s. 1d.	3s. 1d.	2s. 5d.

Stocks and Shares bought or sold through the agency of this Society.

Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society exceeds the sum of £600,000.

STAMP AUCTIONS

of FOREIGN and COLONIAL
POSTAGE STAMPS held
Weekly from September to July.



We have sold nearly a **Quarter of a Million** lots during the last 14 years, obtaining many record prices. All lots are offered within 10 days of receipt. Expert Advice and Valuations free. Liberal cash advances made on stamps sent for sale.

ESPECIALLY WANTED: High-class Colonial Stamps and Collections of Great Britain. Marginal Varieties of Edwardian and Georgian issues.

HARMER, ROOKE & CO., STAMP AUCTION SPECIALISTS,
(DEPT. K), 69, FLEET STREET, LONDON, E.C.

HAVE YOU SEEN THE NEW STYLES?



Crichton's New "Book of Ideas" is now ready—all the new Spring Fashions; send a postcard, and a copy will be sent immediately.

**Why don't you open
an Account at
Crichtons'?**

You can order your New Coat and Skirt, Overcoat, Mac, or Raincoat, Furs, Fur Coats, Blouses, Underwear, Shoes, Trunks, &c., &c. on the "Times" System—quite private and confidential—from 5/- monthly.

A postcard sent off to-night and full details will reach you by return.

Special Terms
to Telephone and
Post Office Staff.



CRICHTONS' LTD.

Ladies' Tailors, Furriers and Outfitters,
14, CRICHTON HOUSE, DEVONSHIRE SQUARE, LONDON, E.C.
(One minute from Liverpool Street Station).

How will the War be Won?

The British Ambassador at Petrograd says: "The Navy will, unless I am mistaken, prove a vital factor."

Another equally high authority says: "It is the Navy that will—slowly but surely—strangle the life out of the Huns and bring them to their knees."

To understand aright the debt you owe the Navy get

THE BRITISH BATTLE FLEET

ITS INCEPTION AND GROWTH THROUGHOUT
THE CENTURIES TO THE PRESENT DAY

BY FRED T. JANE,

WITH

Twenty-five Illustrations in Colour from Water Colour Drawings

By W. L. WYLLIE, R.A.,

and numerous Plans, Maps, and Photographs, &c.

PUBLICATION SANCTIONED BY THE ADMIRALTY.

THE ACCOMPLISHED AUTHOR.

It is the work of a man who writes out of the fulness of knowledge that comes from a lifetime study. An author who writes in such a way as to render a subject, bristling with technicalities, as clear as noonday to all.

This book is no mere catalogue of fighting ships, but the only genuine

HISTORY OF THE NAVY.

It treats of types and designers of those types, takes account of every genuine improvement in "effectiveness" from the days of the "Great Harry," commissioned by Henry VII. (the first British ship designed and used exclusively for war), down to the largest and latest of our super-dreadnoughts, "The Queen Elizabeth."

It gives an authentic account of the important new arms

THE SUBMARINE AND THE WATERPLANE.

Mr. Jane graphically describes both the uses and the limitations of these remarkable engines of war.

In short, this is probably the most vital book of the day, for it makes plain to all the great

task with which our men and our Fleet is entrusted.

SPECIAL VALUE TO MUNI- TION WORKERS AND INVENTORS.

New inventions were never in such demand. The Admiralty and the Munition Department have both set up influential Boards of Distinguished Men specially to examine all ideas submitted, *but these ideas must be practical.* Read "The British Battle Fleet" to understand what is wanted by the Navy.

YOUR SONS IN THE NAVY WILL WANT IT.

They will revel in this book if you send it to them, or keep it until they return to civil life. They know it is written by an able man well qualified to write what is undoubtedly the best account of the Navy, its present purpose and past achievements.

"THE REFEREE" says:—

"The author has 'done his bit' to turn our rule-of-thumb nation into a scientific nation by explaining how the wheels go round. . . . In these days such a book as this is priceless."

ILLUSTRATED CONSPECTUS FREE.

Containing Coloured and Black and White Prints of Famous Ships together with full details showing how the work can be purchased by all without strain upon the pocket.

Please send Form or a postcard mentioning *The Post Office Telegraph and Telephone Journal*.

The Library Press, Ltd., 5 & 6 Portugal Street Buildings, Portugal Street, London, W.C.

Please send me the Illustrated Conspectus of "The British Battle Fleet." This request does not in any way imply that I will purchase the book.

Name

Address.....

Take Hold of Success

More chances are opening up to-day for better-than-average men and women than ever before.

Don't be left behind.

Stop right here and think—don't mar your future by hesitation and timidity—develop your mental efficiency on practical lines—train your mind to achieve—to grip every chance and make the most of it.

Arnold Bennett says mental efficiency is essential to success.

This series of mental efficiency books, edited by a business expert who has helped thousands to success, has just been printed, and to first buyers we offer to send them on approval at our risk. They are marvellous books, unfolding the secrets of business success, rapid progress and certain fortune. Apply quickly for an approval set; only a certain number available.

MENTAL EFFICIENCY SERIES.

Poise: How to Attain It. By D. STARKE.

Force of Character: How to Develop It. By D. STARKE.

Timidity: How to Overcome It. By YORITOMO-TASHI.

Influence: How to Exert it. By YORITOMO-TASHI.

Opportunities: How to Make the Most of Them. By L. CHARLEY.

Common Sense: How to Exercise It. By YORITOMO-TASHI.

Practicality: How to Acquire It. By R. NICOLLE.

Perseverance: How to Develop It. By H. BESSER.

Speech: How to Use It Effectively in All Phases of Daily Life. By XANTHES.

Personality: How to Build It. By H. LAURENT.

Any single volume can be supplied for 3/-; 3/4 by post.

Exclusive Terms to readers of the T. T. J.

By using the Coupon below you can have the entire set to examine for Three clear days, at our risk. You can then either return them or keep the set and send

2/6 only,

the rest being payable by monthly instalments.

YOU RUN NO RISK.

WAR WORDS and their meaning.

Enclose two Penny Stamps for a copy of this valuable book. Ask for complete catalogue, which will be sent post free.

Coupon for Free Inspection.

To Messrs. FUNK & WAGNALLS,
134, Salisbury Square, London, E.C.

Please send me on approval for three days, carriage paid and entirely at your own risk, a set of the MENTAL EFFICIENCY BOOKS. If approved, I will send 2/6 within 8 days and 2/6 per month thereafter till the full purchase price of 30/- is paid. If I do not want the books after inspection I will return within three days of receipt.

Name

T.T.J. Address

THE Telegraph and Telephone Journal.

VOL. II.

JUNE, 1916.

No. 21.

CONTENTS.

	PAGE		PAGE
THE SINN FEIN RISING	177	CORRESPONDENCE.....	183
TELEGRAPHIC MEMORABILIA	178	EDITORIALS—	
TELEGRAPH TARIFFS	179	TELEGRAPH TARIFFS	181
LONDON TELEPHONE SERVICE NOTES	179	DUBLIN	184
THE BOOKING OF TRUNK DEMANDS BY THE "A" TELEPHONISTS AT THE CENTRAL EXCHANGE, EDINBURGH	180	THE INTRUSIVE COMMA	185
REVIEW	181	HIC ET UBIQUE	185
A PROFITABLE EVENING	181	TELEGRAPH TARIFFS AND ECONOMIC NEEDS. BY JOHN LEE	186
		PERSONALIA	190

Subscription: To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies: To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

THE SINN FEIN RISING.

THE principal vicissitudes of this unhappy affair, the destruction of Post Office and the suspension of the telegraph service, will ere now have become familiar to our readers through the medium of the Press. The local telephone service, restricted of course to military purposes for some days, was maintained throughout the rebellion, and proved invaluable. The ordinary Bank Holiday complement of the female staff were on duty at the time of the outbreak, and most of them stayed on day and night until the worst was over. We are enabled to publish the following extract from the report of the Traffic Manager, Dublin, describing the events of the first few days. It seems to us to be most impressive in its direct official language, plainly reciting the facts.

"On Monday, April 24, at noon, intimation was received of the outbreak of the rebellion, and that the Post Office had been attacked. Mr. S. Verschoyle, Skilled Workman, Class 1, immediately summoned military assistance. This prompt action no doubt considerably assisted in preventing the exchange building being seized. All entrances to the building were closed by the doorkeeper (Mr. Hartnett). A military guard, consisting of eighteen men, under the command of Lieut. Kearns, Royal Irish Rifles, arrived at 3.20 p.m. after a very difficult journey through the city. About 3.35 p.m. a party of rebels approached the building from Fleet Street, but, on hearing the military were already in occupation, retired. A second party arrived outside the exchange building about 4.5 p.m. but also retired. The supervisors in charge of the exchange (Miss C. McShane and Miss A. McLoughlin) immediately took steps to advise the Controller of Telegraphs, the District Manager and an officer of the traffic staff, and also acquainted the Viceregal authorities of the seriousness of the situation. The traffic officer (Mr. Coggin) arrived at the exchange at 2 p.m., having heard of the trouble in the city; the service telegram sent did not reach him.

"The traffic gradually increased in volume until it was impossible to cope with the rush, and at 9.50 p.m., the ordinary service was suspended and only calls on military business allowed through. Notwithstanding this, however, it was impossible—owing to the heavy military traffic, &c., and to the fact that very few of the ordinary male night staff were able to approach the exchange—to avoid the employment of the telephonists all night. Information regarding the rebellion did not reach me until 7 a.m. on Tuesday, April 25.

I immediately attended, and remained continuously on duty until May 6. Arrangements were at once made for provisioning the staff, and a full supply of foodstuffs was maintained from April 25 until May 3. Arrangements were also made to provide sleeping accommodation for the staff confined to the building, and 42 beds were obtained and suitably installed.

"Very considerable nervous strain was imposed upon the staff, which increased in its intensity owing to three important factors following in rapid sequence:—

(a) To rumours during April 24, 25 and 26 of a probable attempt to capture the telephone buildings, which kept excitement at a fairly high level.

(b) To the intensity and close proximity of artillery, rifle and machine gun fire on the 26th, 27th and 28th.

(c) To the presence of a large number of snipers in the vicinity of the exchange. They were a constant menace to the telephonists. Several bullets entered the building, one of which came through the roof of the switchroom.

"It is considered that the military operations were materially assisted by the steadfast allegiance of the telephone staff, many of whom traversed the streets at considerable personal risk. The demeanour of those on duty calls for the highest appreciation. Valuable assistance was rendered by those members of the engineering staff who attended for duty during the crisis."

The staff on duty had an undeniably anxious time. Although the supply of food was well maintained on the whole, on one night in Easter week it was reduced to stale bread and tea. On another day the military warned the staff that a bombardment of a neighbouring street might be expected, and the switchboards were protected as far as possible with boards, mattresses and *horribile dictu* with bundles of the tickets, used on happier occasions for the recording of calls. The telephonists were told to put on outdoor clothes, partly for further protection and partly in order to be able to leave the premises quickly if necessary. This naturally produced a state of great tension and excitement which was happily relieved by a humorous touch. One of the telephonists emerged from the retiring room not only fully hatted and cloaked but with her umbrella up. The sight of this novel bomb-protector caused some merriment and relieved the tension considerably; afterwards all went better, nor did the anticipated bombardment take place.

The Postmaster-General and the Secretary visited the exchange on the Saturday, and Mr. Pease addressed the telephonists and all

assembled thanking them on his own and the Government's behalf for the manner in which they had acted and maintained the service.

The General Officer Commanding-in-Chief the Forces in Ireland has addressed the following letter to the Secretary of the General Post Office, Dublin :—

Headquarters, Irish Command,
May 10, 1916.

Sir,—I desire to convey to the staff of the Post Office my high appreciation of the services rendered by them during the recent disturbances in Dublin. The staff of the telephone exchange and the engineers and telegraphists in particular performed their duties throughout the hostilities under conditions which must have imposed a very severe strain on every member, which, I am aware, were in all cases readily and efficiently undertaken regardless of personal danger, thereby materially conducing to the success of the military operations carried out.—I am, sir, your obedient servant.

(Signed) R. HUTCHISON, B.G., E.S., for General
Commanding-in-Chief the Forces in Ireland.

TELEGRAPHIC MEMORABILIA.

It is perhaps well, at times, that the public are pulled up sharply to attention by a break in the comfortable continuity of the communications of these islands. Since the present conflict commenced railway services, boat services, posts, telegraphs and telephones have now and again been peremptorily compelled to give way to the urgent needs of Army, Navy or munition demands. Unpleasant as may have been the recent break in the trans-Irish Channel Post Office services, it may incidentally have enabled some of our duller fellow-countrymen to realise the daily benefits of the public services which they enjoy, and the fact that we are at war.

Among the many newly coined words which scientific and development wedded to the human desire for expression are constantly bringing forth, the philologist will surely not miss the very neat *mot* of *radiophare*, applied by the French to describe any lighthouse equipped with a wireless telegraph system. It is now fully and officially recognised in all standard technical books.

Writing of "wireless" it is announced that Pope Benedict is about to give his Pontifical blessing to wireless telegraphy, and possibly may already have conducted the ceremony before these lines are in print. This is simply following an ancient custom of the Roman Catholic Church which from time to time has bestowed blessings on inventions of great benefit to humanity.

In reading over a recent report on the Indian Telegraphs one observes more than one reference to the co-operative societies formed for the benefit of the staffs at various offices. From the somewhat meagre details at present to be gathered, these organisations are assisted by the administration. It is not improbable that East may re-act on West and that after the war economic conditions in Beliti may lead to steps in a similar direction.

Now that it is officially announced that the telegraph and telephone traffic management is a definite amalgamation with an ex-telephone superintendent as head of the combined staff, it is hoped that the Telegraph section will rise to the occasion and realise that the time has arrived for the shaking off of apathy and the girding up of loins. It is up to the Telegraphs to look to its laurels, and to see that it is adequately represented especially in the pages of the TELEGRAPH AND TELEPHONE JOURNAL. Small blame to the Telephones if, in season and out of season, they point to the merits and advantages of their particular wares. The appointment of Mr. Dalzell as chief is however a token that the *pros* and *cons* of both sides will be carefully weighed. With those of us who still hope "that the best is yet to be," for the Telegraphs as for the Telephones, rests the responsibility of proving that the profession of Telegraphy is not among the dying industries! It means much earnest work, much slaying of old prejudices, much judicial sifting of evidence, much pushing forward of ideas and schemes. The Telephones has in its organisation much fresh young blood, which while probably possessing the usual faults of impetuous, if earnest

youth, nevertheless has the great advantage of more or less definite goals and the splendid, priceless asset of ideals. This latter dynamic force is by no means too much in evidence on the Telegraph side.

There is every reason to have confidence in the open-mindedness of Mr. Dalzell and his newly amalgamated staff of inspectors of telegraph and telephone traffic. It is hoped therefore that wide appeal will be made to and ample selection from amongst representative practical telegraphists when questions vital to the re-organisation of the Telegraphs come up for review from time to time.

The utility of type printing telegraph systems has received distinct encouragement and from unexpected quarters during these war months. Slowly but surely it has been borne in upon somewhat conservative minds that for certain types of figure and cypher telegrams some system of type-printing telegraphy has become a very pressing necessity. It has been noted that not only have certain of our own Government offices made requests for some form of typed delivery copy, but representatives of allied governments in this country have successfully pleaded for the *printed* as against the *written* word.

One example could at least be instanced where a certain foreign government department preferred delivery of their telegrams from a distant tube office because by this arrangement they could obtain the original type-printed telegrams as received from abroad. The previous arrangement had involved the re-transmission of important cypher despatches and the *writing-up* of the same.

In this connexion it is also not without interest to remark that the—by some—supposed complete supersession of the under-rated Hughes apparatus has probably received another check. It is not maintained that the Hughes apparatus holds the entire field, but from a lengthy experience and at the risk of being in my own turn described as conservative, the writer can confidently maintain that in a skilled manipulator's hands the Hughes is capable of turning out as rapid and accurate work as could be desired. It is however like unto any other form of telegraphic apparatus, and if the utmost and the best is to be obtained skilled labour must be employed. The Hughes in England has suffered very distinctly from lack of a scientific system of teaching its manipulation. It is not urged that it could possibly take the place of any of the present fast speed systems, but it is most positively maintained that the British companies and Governments alike—except in one instance—have never earnestly applied themselves to obtaining the best results from this very valuable system. Nowadays one must step across the Channel to see its possibilities.

In this connexion of the type-printing Hughes the recollection of a recent expedition to the East Coast where only this type of apparatus could for the moment be used and was so used, both simplex and duplex, leads my discursive pen to become somewhat eulogistic of the American professor's invention.

While still harping on the theme of type-printing telegraph systems, it is not inopportune to revert to the ever-present trouble of faulty type-impressions. The ink provided may at times and in some cases prove to be the primary cause of this annoying defect, annoying alike to the addressee, the intermediate telegraphist who may have to re-telegraph from an almost unreadable copy, and last and also perhaps least, in some folks' estimation, to the advocate of type-printing telegraph systems as a modern necessity and benefit to the community.

Continuing in grumbling mood I shall ask no permission to work off my spleen on the plague of uncorrected errors from certain types of printing telegraphic apparatus. To rush off telegrams unchecked containing palpable errors in order to obtain high outputs is not business, is not telegraphy, and—I may as well write it as think it—is not honest. It cannot permanently further the interests of any system and may even be the means of unjustly throwing discredit upon the very apparatus it is most desirable to save from failure.

The true scientific and the true British business spirit which is going to win in the present war and excel afterwards is one that,



THE ROLL OF HONOUR OF THE EDINBURGH TELEGRAPH STAFF.

far from glossing over or masking faults, goes back to the root of difficulties, and finds the remedy. What is it Clough says?—

"I will look straight out,
See things, not try to avoid them.
Fact shall be fact for me.
And the truth, the truth for ever."

J. J. T.

TELEGRAPH TARIFFS.

The Leeds correspondent of the *Postal and Telegraph Record* says:—The extracts from Mr. John Lee's paper published in last week's *Record* make such interesting reading that everyone interested in the future of the telegraphic service will be eager to read the full text. The ideas set forth, if adopted, would mark the beginning of a new era so far as telegraphic administration is concerned. The attitude taken up by the State, due to its monopoly of the service, would be in a fair way to become undermined, and we might have the spectacle of commercialism introduced to meet the requirements of the public. The idea is so revolutionary, in contrast with the usual traffic innovations, that it is hard to realise that its emanation comes from within. At the same time

Mr. Lee's paper is a confession that the telegraphs, as at present constituted, with all their efficiency in organisation and equipment, are unable to cope with the normal everyday traffic. The proposal to introduce deferred-rate telegrams appears to be an adroit inducement to the public to hand in telegrams not as needed, but as and when most convenient to the Department. The greatest difficulty in the way of successful administration has always been that the public persisted in the view that the telegraph service was a medium by which its own peculiar requirements could be met. Would the introduction of deferred-rate telegrams remove this difficulty? The success or otherwise of the whole scheme depends on the answer to this question. The length of deferment would appear to be the determining factor. If a guarantee could be given fixing a time limit of two or three hours, according to distance, in all probability many people would avail themselves of the cheaper tariff. The delivery by next morning's post, however, probably would be a fatal barrier to the general adoption of this method of communication. The chief essential is quickness of delivery, as the "man in the street" forsakes the penny post with this idea uppermost in his mind. It must be confessed that confidence in the efficiency of the telegraph service has been badly shaken of late, and this feeling has not been entirely engendered by war-time expedients. Until confidence has been regained, the time does not appear to be propitious for the embarkation on any such scheme as outlined. The only way to restore this confidence is by the more expeditious delivery of the traffic which is at present dealt with. Whilst the hours of opening of offices are being more and more curtailed, and whilst more and more veritable *telegrams de luxe* are being posted, it is hopeless to dangle inducements of still further delay before the British public. There is no doubt that the ninepenny rate has proved prohibitive in very many cases, and has not been the success it was hoped to have been. The proposed eightpenny rate would in all probability meet with a like fate. The true solution may come in the reversion to the sixpenny telegram, which, provided a sufficiently tempting bait in the way of greater accuracy and speed of delivery were offered, would attract increased revenue in a way which no other minimum could do.

LONDON TELEPHONE SERVICE NOTES.

FOR once at least rumour has proved to be right, and before last month's notes appeared in print, Mr. Harvey Lowe had left the London Telephone Service for the Secretary's Office. We shall miss very much his genial presence, but we wish him many successful years as a Deputy Chief Inspector. It would be interesting if at some future meeting of the Telephone and Telegraph Society Mr. Lowe could be persuaded to tell us wherein lies the main difference between the duties of a "controller" and an "inspector." If it were given to us to choose, we think we should decide in favour of an inspectorship. Mr. Lowe carried with him, in addition to the heartiest good wishes of all the members of the L.T.S., an outward expression of these in the form of a silver rose bowl. The traffic branch of course contributed to the gift, but were unable to assist at its presentation as, by an unfortunate oversight, they were left without advice of the time and place of the ceremonial.

The "clerk of the weather" has exhibited a relentless animosity to the Telephone and Telegraph Society, and he showed no eleventh-hour repentance for the final meeting, but no amount of foul weather could keep away those members who have learned to appreciate a good thing. Mr. John Lee's paper as circulated in proof was a joy, yet in delivery it gained many an added charm by some subtle and unexpected little aside. For our part we were in complete agreement with the Chairman's suggestion that Mr. Lee should be invited to give a series of papers. As everyone knows Mr. Lee is a reformer, and it was not surprising therefore that the burden of his lay should have been the same as that of other reformers, "ninepence for fourpence," only the gilt was to some extent taken off the gingerbread by the knowledge that to enjoy this privilege one's telegram had either to suffer delay or to be confined to a

restricted area. The lecturer expressed himself as strongly in favour of dealing with the telegraph service on commercial lines, and although he did not actually put forward the suggestion it would seem to follow that the sender of a telegram would be entitled to a voucher, on presenting twelve of which at any Post Office he would receive free *gratis* and for nothing a prize of value—probably a free telephone call.

By the way as we journeyed home in the train after the meeting, we overheard a father telling his small son the story of Tele-never land and its chancellor of the exchequer. The story is probably familiar. In Tele-never land there was equality of opportunity for all, and when the office of chancellor became vacant it was advertised and applications invited from candidates who had to undergo an examination. The examination, which was written, consisted of but one question which read "State what you know?" Now many of the candidates considering that a chancellor of the exchequer would be expected to deal with figures and accounts, wrote up elaborate treatises on those interesting subjects, but one candidate simply wrote a description of a journey from his own house to that next door, but so charming was his power of expression, and so captivating his description of the woods through which he had wandered (he seems to have taken a roundabout route), that he was with one voice proclaimed chancellor, and as history shows a very excellent chancellor he made, but his knowledge of accounts—.

Amongst the distressing facts of the Dublin rebellion, there is at least one redeeming feature for telephone men and women, Dublin Castle was saved by the telephone! We saw also with admiration that one of the girls employed at the Post Office on telephone work had refused to leave until she had dressed the wound of an injured soldier—exactly what one would have expected of the telephone staff. Which reminds us that Miss Heap is making a special appeal to the women of the London Telephone Service on behalf of the Star and Garter Hospital for Wounded Soldiers.

The number of men from the L.T.S. joining up for active service continues to grow daily. The London Electrical Engineers' Corps appears to be the most popular unit with the staff of the Controller's Office, and so many have already joined that those men now being drafted into that corps will find it difficult to believe that they are not yet at the office, particularly as they will still be at the beck and call of "subs."

We thoroughly enjoyed the emergency operator's description of the real operators' work and behaviour during a threatened air raid, and we look forward with even greater pleasure to the real operator's description of the emergency man's activities at such a time. If some of the accounts which have reached us are correct, an emergency operator fills the same relationship to the real article as did "Peter Pan" to the ordinary bairn.

We have previously had occasion in these notes to congratulate the L.T.S. on its benefactions, and we now have another opportunity of the kind. The annual collection of the Rowland Hill Benevolent Fund, which has just been completed, reached the excellent total of £102 10s. 5d., an increase of nearly £11 on last year's collection. We understand also that the purchase of War Savings Certificates is being keenly taken up by the exchange and office staffs. The certificates have only been on sale for a few weeks, but by May 12 the total of the stamps sold amounted to £368 4s. An L.T.S. War Savings Society is being formed in order to facilitate the further sale of these stamps and certificates, and we shall hope to see every member of the L.T.S. whose salary doesn't exceed £300 (certainly the majority!) take up at least one share.

BRITISH RED CROSS HOSPITAL AT VALETTA, MALTA.

At the beginning of last winter many of the Metropolitan exchanges promised to send gifts to the Red Cross Hospital in Malta. A letter recently received from the secretary, acknowledging a gift of garments and swabs, says: "May I add that the telephone exchanges in London and surrounding districts have been most liberal in their help for the sick and wounded here."

The exchanges will be pleased to know that their gifts have been appreciated.

THE BOOKING OF TRUNK DEMANDS BY THE "A" TELEPHONISTS AT THE CENTRAL EXCHANGE, EDINBURGH.

ON Jan. 13 trunk record working was abandoned at Edinburgh and the booking of all trunk demands by the "A" telephonists was introduced at the Central and Leith Exchanges. The introduction of the recording of trunk calls by the local telephonists at Leith Exchange, with which but 1,040 subscribers' lines are connected, calls for no special notice, but at the Central Exchange, which has upwards of 8,000 subscribers' lines, the innovation is important and of special interest to traffic men, since Edinburgh is the largest local exchange in the provinces.

Not only was the local service at the Central little affected by the additional work of recording about 200 trunk calls in the busy hour, and passing them to the trunk exchange over record order wires, but during the early days of the arrangement, the service observations showed that the telephonists' average answer and clear, and the average time of the total operation of calls, had not risen appreciably; indeed, after a few days' experience the general service at the exchange was rather better than before the booking of trunk calls was introduced. Lest this seem incredible some explanation is necessary.

First of all, a very careful analysis of the originating trunk traffic was made, and then particular pains were taken to distribute the lines of subscribers who are trunk users in a way that would make the average trunk load light. Then, in redistributing the lines of trunk users, the opportunity was taken of rendering the general distribution as favourable as possible, and, in reality, the telephonist's load was better leavened, even with the addition of an average of four trunk calls to be recorded, and passed by each "A" telephonist, in the busy hour. Before the redistribution, some "A" telephonists had to connect as many as ten, and even thirteen, subscribers with the trunk record lines in the busy hour. Thus, it will be seen that the position of the "A" telephonist has been improved, since the redistribution has promoted greater flexibility of team working.

Other means were also taken to make the abandonment of record working a complete success. A special meeting of supervisors, at which every likely difficulty was discussed, was held a few days before the change was introduced, and thereafter a carefully worded circular was issued to every telephonist. The following extract from the observation records on the first, second and third days of the alteration may prove interesting:—

Observations taken on Jan. 13, 14 and 15, 1916.

Central Exchange.	Aver. ans.	Aver. disc.	Percentage of calls answered in					
			2 secs. or less.	3 secs. or less.	4 secs. or less.	5 secs. or less.	10 secs. or less.	20 secs. or less.
13.1.16	5.4	4.8	13.7	41.2	54.9	64.7	92.2	100.0
14.1.16	6.1	4.9	25.0	47.5	60.0	67.5	85.0	92.5
15.1.16	4.0	3.5	45.5	68.2	77.3	81.8	95.5	100.0

It should also be indicated that the average time taken to record a trunk demand at the Central Exchange is 7.3 seconds, and the average time occupied in passing it to a record telephonist at the trunk exchange is 5.9 seconds.

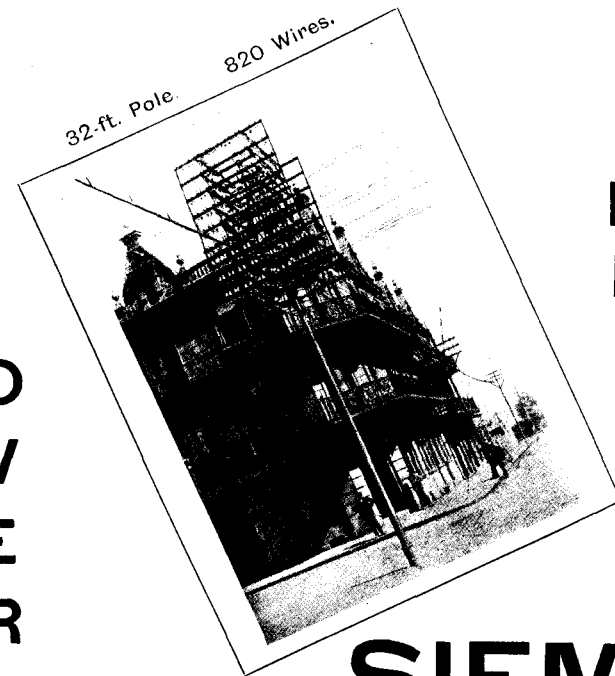
Save a brief explanation by the telephonist at the outset, which was restricted to a sentence, no intimation of the change was made to subscribers, and, indeed, as experience proved, no special intimation was necessary, for they fell into the new method quickly, and many expressed appreciation of it.

The abandonment of record working at Edinburgh Central Exchange is an excellent preliminary step to the introduction of trunk control, and it is being used as an educational measure towards that end. It affords the "A" telephonists an opportunity of familiarising themselves with the new trunk codes, and with the handling of trunk tickets generally.

The next step will be the introduction of a service of junction quality between Edinburgh and Glasgow, and for that innovation practically everything is ready, from a traffic point of view.

Were it not that Edinburgh Central will be the largest combined

O
V
E
R
H
E
A
D



L
I
N
E



E
Q
U
I
P
M
E
N
T

SIEMENS

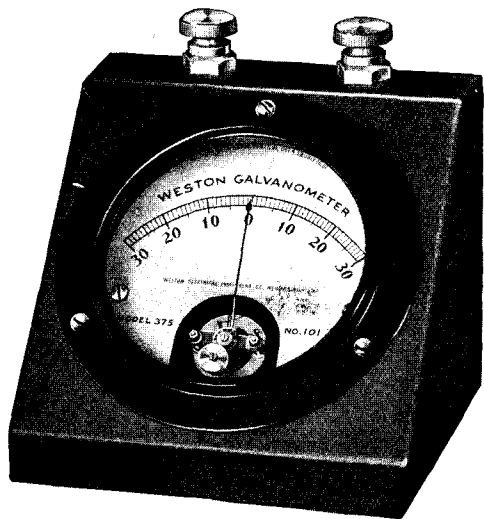


M
A
T
E
R
I
A
L



SIEMENS BROTHERS & CO., LTD., WOOLWICH, S.E.
ESTABLISHED 1858. OVER 4,000 EMPLOYEES.

WESTON STUDENTS' GALVANOMETER



MODEL 375.

List Price, 40/-

Write for full particulars to:—

WESTON ELECTRICAL INSTRUMENT CO.

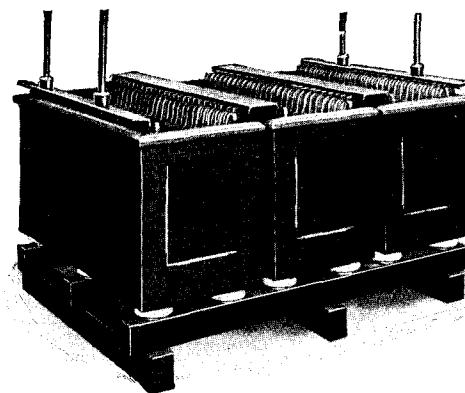
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

Now Ready.

AGAIN ENLARGED.

Price 3/6 net.Postage { United Kingdom, 6d. extra.
Abroad - - - 1s. 4d. }

The Year Book of Wireless Telegraphy and Telephony, 1916

(FOURTH YEAR.)

1,000 pages. Numerous Illustrations. Cloth, Demy 8vo.

CONTENTS:

The Wireless Telegraph Laws and Regulations throughout the World.

Complete List of Land and Ship Stations with Call Letters, Wave Lengths and Hours of Service.

International Time Signal Regulations.

Special Articles by Leading Experts.

Map of Wireless Stations of World (Revised 1916). etc., etc., etc.

"The only reference work on the subject."

THE WIRELESS PRESS, LIMITED,
MARCONI HOUSE, STRAND, LONDON, W.C.

STANDARD TECHNICAL WORKS

AUTOMATIC TELEPHONY. A clear description of the Strowger Automatic Telephone System as adopted by the G.P.O. By S. TURNER, E.-in-C.'s Office. 32 pp., illustrated. 7d. net, post free.

TELEPHONE TROUBLES, AND HOW TO FIND THEM. On both the Magneto and C.B. Systems. Sixteenth Edition. 7d. net, post free.

NOTES ON TELEGRAPHY. By G. Mogg. A simple exposition of the rudiments of technical telegraphy and telephony. Specially designed to meet the requirements of the C. and G. Ordinary Examinations. 2s. 6d. net, or 2s. 9d. post free.

THE TELEGRAPHISTS' AND TELEPHONISTS' NOTE BOOK. Third Edition. Highly spoken of by leading P.O. officials. Price 1s. 6d. net, or 1s. 7d. post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY FINAL EXAMS., 1906-15. By H. P. Few, Silver Medallist. An invaluable work, recommended by the leading technical journals. Limp Cloth, 8vo., 1s. 8d. net, post free.

THE TELEGRAPHISTS' GUIDE. By BELL and WILSON. The best work of its kind. For teachers and students alike it is invaluable, and the repeated calls for fresh editions prove its merit. Sixteenth thousand. 2s. net, or 2s. 3d. post free.

TECHNICAL TELEGRAPHY. By ROBERTS and BURROWS. Fifth Edition. Contains an exhaustive selection of questions and model answers in all grades of the C. and G. exams. 2s. net, 2s. 2d. post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY. By H. P. Few. Includes model solutions to the C. and G. exams. 1904-1914, as well as to several typical questions set at the Post Office Departmental exams. for Overseerships. Fourth edition. Cloth. 230 pages, 172 illustrations. 2s. 6d. net, or 2s. 9d. post free.

PRACTICAL TELEPHONY. By JAS. BELL, A.I.E.E., and S. WILSON, A.M.I.E.E. A simple and practical handbook suitable for students, artisans, &c. Copiously illustrated. Latest edition. Twelfth thousand. 3s. 6d. net, 3s. 9d. post free.

Sent post free at prices stated by

S. RENTELL & CO. Ltd., 36, Maiden Lane, Strand, London.
WRITE FOR CATALOGUE NO. 36.

exchange in the country, there would be no justification for recounting the experience there of what, after all, has been done successfully at other exchanges, but the combination of a local exchange, which will soon have a 10,000 subscribers' multiple, with a trunk exchange having a staff of approaching 40 telephonists, is not an inconsiderable step in telephone organisation.

R. G. D.

REVIEW.

Wireless Telegraphy. By Dr. J. Zenneck. Translated from the German by A. E. Seelig. Published by the McGraw-Hill Book Co., 6, Bouverie Street, London, E.C.—The writer has frequently been asked by students of wireless telegraphy for advice in the choice of a book. After running over the various English works dealing with the subject he has invariably added "But if you can read German you cannot do better than get Zenneck's *Lehrbuch der Drahtlosen Telegraphie*."

Unfortunately, however, a knowledge of German is not very common among electrical students in this country, and consequently, for the majority, Zenneck's text book was not available. This disadvantage has now been removed by the publication of the translation under review.

The book is divided into fourteen chapters. Of these, the first five deal with theoretical matters and the remaining nine with the application of these theoretical investigations to wireless telegraphy.

The first chapter deals with the general theory of electrical oscillations in any circuit containing capacity and inductance, and the second with the special case of open oscillators. In the third chapter the phenomena of the high frequency alternating current circuit are discussed, together with the methods employed for carrying out the measurements required when dealing with high frequency currents. The coupling of circuits is dealt with in chapter four, and the fifth chapter is devoted to resonance curves, their determination and application in high frequency investigations.

The nine chapters devoted to wireless telegraphy proper respectively deal with antennae, transmitters of damped oscillations, high frequency machines for undamped oscillations, the production of undamped oscillations by the use of the electric arc, the propagation of electric waves over the surface of the earth, detectors, receivers, directive wireless telegraphy, and wireless telephony.

At the end of the book are given tables of data useful to a wireless telegraph engineer, a bibliography, and a collection of notes in which many theoretical and mathematical points are dealt with more in detail than in the body of the book.

The book is well printed and bound, the diagrams and illustrations are beautifully clear, and we have noticed very few errors.

In the first note on page 35, however, the words "current node" are used in place of "current anti-node" or "current loop." This error occurs in the original, and has not been corrected in translation.

On page 85, first paragraph, and again on page 99, last paragraph, the statement is made that, in order that the current induced in a circuit containing resistance and inductance by the oscillating current in another circuit with which it is coupled may always be proportional to the current in this circuit, no matter what the frequency may be, the inductance in the first circuit must be large in comparison to its resistance. This statement should be reversed. The inductance must be negligibly small compared with the resistance if the magnitude of the induced current is to be independent of the frequency of the inducing current. This statement also occurs in the original.

In Fig. 389, page 324, the key connexions are shown wrongly. The key should be arranged so as to break contact when it is depressed, not to make contact. A footnote on page 323 says:—"The key is not drawn correctly in Fig. 389." This is an exact reproduction of the original, but it would have been better if in the translation the mistake in the diagram had been corrected.

It is, however, only to these few points that we have to take exception. On the whole the book is excellent, and we are sure it will be welcomed by wireless students in this country.

A PROFITABLE EVENING.

WITH the London Telegraph and Telephone Society it is "business first and pleasure afterwards," so that one was not surprised to find upon entering the hall on the Victoria Embankment where Mr. John Lee had been announced to read his valuable paper, that the membership were very busily engaged in disposing of various items indispensable to an annual general meeting.

If some of these items had little relationship to "Telegraph Tariffs," there were others which had a very distinctive and definite connexion with "Economic Needs," the balance sheet for example.

The reduction in membership had been considerable owing to the war, although not so great but that with judicious cutting of coat to cloth, the prospects of a successful 1916-17 session are at all likely to be marred, a very fair amount of cash being carried over to next account.

Space is restricted, but the encomium heaped upon the retiring chairman, Mr. Morgan, Controller of Stores, for his year of specially devoted service to the society must not be permitted to pass without printed emphasis and record. Few are aware of the strainful months through which the ex-chairman has passed since August 1914—strenuous indeed among the strenuous.

In face of these facts it has puzzled his many friends to note the freshness with which at the end of a tired day he has taken up the by no means facile duties at the Institute of Electrical Engineers.

The society is particularly favoured in its selection of chairmen, nevertheless it came somewhat as a surprise to hear that Mr. A. B. Walkley had consented to be nominated as Mr. Morgan's successor. It was of course no surprise to hear him unanimously voiced into the vacant seat.

The paper read by Mr. John Lee, which followed the above "business," was unique in its setting and delivery. If any one of the small and loyal audience there assembled on April 18, 1916, had put in an appearance from a strict sense of duty to the society, but also with the firmest of convictions that nothing less than a nodding-stool could keep such an one awake during the reading of so ponderous and abstruse a subject as "Telegraph Tariffs and Economic Needs," surely he or she must have been agreeably disappointed.

Mr. Lee is an artist in economics as distinguished from the dry-as-dust professor. True, he reads and studies and dives into the profound writings of the economic learned ones, and digests their theories, but he is his own expositor. He knows when to throw over the high-sounding technicalities of the conventional class-room and when to enunciate his own projects and his own doctrinal interpretations, and when to drive home a point with a touch of slyly subtle dry humour. What, however, attracts one to Mr. Lee is his evident open-mindedness. Speaking in reply to some of his critics he said in effect, "It is not my purpose to answer all that has been said point by point, but rather that we should one and all contribute our quota to the general fund of thought and knowledge on the question of the future of the telegraphs of this country. Some things that have been said this evening have awakened fresh trains of thought in my mind, and although it would be premature to say that I am convinced of error, I can easily realise that there is much to be said on the other side regarding certain of my views. I have not yet made up my mind whether I am right!"

The discussion which followed struck one as being mixed both as regards character and quality. The Telephone side by no means did itself full justice. It may have been the shadow of coming events and the knowledge that he was slowly drifting into a position where it would be his daily task to stand, scales of justice in hand, judging as between telegraphy and telephony; it may have been the sadness of severing complete devotion to his first child, telephony, that affected the speaker, but certainly it struck more than one of his listeners that even Mr. Dalzell was not quite up to his usual standard. One was glad, however, to hear this gentleman state so earnestly and so emphatically that "one of the lessons of the war was decidedly that the full national value of both telegraphs and telephones cannot be adequately expressed in £ s. d." as undoubtedly he spoke with full authority and with an exclusively deep knowledge regarding many of the inner facts of

the last two years—facts which indeed must still be withheld even from many of the wise and prudent. Mr. Dalzell's tariff suggestions may be condensed as follows:—

Quality I.—*Express delivery by Messenger.*

Local	minimum charge	4d.
Up to 100 miles	"	7d.
Beyond " "	"	9d.

If sent to a telephone number instead of by messenger, one penny less to be charged.

Quality II.—*Restricted to the eight less busy hours of the day and delivered by Post or Telephone.*

Up to 100 miles	4d.
Beyond " "	5d.

Mr. Edmonds gave a facetious touch to the discussion but was in the main unconvincing, and was evidently handicapped by stepping early into the breach before he had fully recovered from the whirlwind of Mr. Lee's eloquence.

A speaker from the A.G.D. adumbrated some interesting figures that could be produced in full regarding the relative cost of telephone and telegraph lines and apparatus. Perhaps it may be permissible for this member to assist by a letter or article to the TELEGRAPH AND TELEPHONE JOURNAL on the subject.

A document of this apparent value should prove not merely interesting but illuminating. As was but natural those who came to grips with the subject of the paper and with the points raised by the lecturer were those most closely connected with telegraphy and the telegraph world.

Considering the vital issues involved it was surprising that more speakers were not forthcoming from the Telegraphs. The absence of the Deputy-Controller of the C.T.O. was the subject of considerable sympathy by those who knew of his prolonged illness, doubtless the society lost much by his compulsory absence and imposed silence. There were, however, others present who have grown grey in this arm of Post Office service, and whose expressed experience would have been listened to with profit had they but favoured the assembly with their ripened opinions. However Mr. Mansbridge, himself an old telegrapher and a stalwart supporter of the society in all winds and weathers and moods and subjects, touched one of the vital spots of the whole matter when he called for, "a declaration of the value of the telegraph load factor." This query it should be said could not be replied to off-hand and before the tariff question is settled will doubtless form the subject of many another question and answer.

Mr. Tapley thought that "they should be particularly grateful to the lecturer for the way in which he dealt with the usually unappreciated benefits which the community derives from the Telegraph Service, and no less for the frank and full recognition of the human element. For the proper maintenance, development and improvement, no responsible effort should be spared to enlist the intelligence and goodwill of each individual servant of the public. To obtain the hearty co-operation of the general body of the staff would be to secure a most valuable asset to the Department."

Coming to details the speaker said: "I question whether the 30 minutes' time limit between the urgent telegram and the non-urgent telegram would not prove to be too narrow a margin. Perhaps my views on this subject have been warped by the censorship of foreign telegrams. The Censor is of course the devotee *par excellence* of the reflective pause."

The Assistant Controller of the Cable Room in conclusion remarked that whether agreeing or not with all of the details of the scheme put forward by Mr. Lee, all would doubtless recognise the lofty tone of his address. He had shown too that economics was far from being a "dismal science" when the subject got into proper hands for treatment.

The Controller of the C.T.O., having himself occupied the position more recently held by Mr. Lee, and with 46 years' of telegraph service behind him, naturally had one or two very practical points to make.

Mr. Newlands emphasised the importance of the subject and

the therefore absolute need for open debate. Mr. Lee had given them ample food for discussion and thought. After recapitulating Mr. Lee's proposals in tabloid form that there should be two rates (a) urgent and (b) deferred, that the tariffs be respectively an eightpenny minimum and a fourpenny minimum with in each case a $\frac{1}{2}$ d. per word rate after the first twelve words, the Chief of the C.T.O. continued:

"Mr. Lee says truly, 'our function is to extend the use of the telegraphs.' We have to widen the utility of the telegraph service by making it attractive and yet we must maintain a simple method of charging. Certain of the European countries already have an urgent and a deferred rate, but the proportion of urgent is insignificant, being only 4 or 5 per cent. of their whole telegraph traffic.

"In 1907 India had three rates:—

RS 2 Urgent, say, 14 or 15 per cent.

RS 1 Ordinary (considerable).

AS 4 Deferred (majority).

This intricate system involved different sets of forms and official markings together with separation into three classes at each circuit. This would become impossible in the United Kingdom owing to volume of traffic. It also involved a separate system of delivery, and there were shocking delays. I managed to change this business cumbrous system in 1908 to two classes 'urgent' and 'ordinary,' the new tariff being RS 1 and AS 6, with the result that the 'ordinary' went through so fast that I estimated the 'urgent' class ought to die a natural death if a proper service continued to be given.

"In view of the fact that the Indian Telegraph system covers an enormous area, roughly 1,900 miles N. to S. and 1,900 miles E. to W., I pointed out that a four anna or 4d. rate would never pay, consequently the ordinary rate is now 6d. for twelve words.

"On the other hand a 4d. rate in the United Kingdom where the distances are short and the large towns are relatively close together should suit admirably. It would resolve itself into a 'local rate' within postal areas and into a general means of filling up the wires outside the normal hours of ordinary business pressure.

"The 4d. for eight words and $\frac{1}{2}$ d. per word thereafter is an ideally scientific telegraph tariff. It admits of a brief cheap telegram being sent and if a longer message is requisite it simply restores the sixpenny telegram at the twelfth word.

"In the United Kingdom we divide the telegraph day into two equal periods of 'day' from 8 a.m. to 8 p.m. and 'night' from 8 p.m. to 8 a.m. Fifteen years ago I found that our traffic was dealt with in the proportions of 50 per cent. between 10 a.m. and 2 p.m., and the remainder between the hours of 8 a.m. to 10 a.m. and 2 p.m. to 8 p.m. The problem, therefore, is how to relieve or level down the peak or pressure period by a higher tariff during certain business hours while filling up the wires and filling up telegraphists' time after the more strictly business telegrams are disposed of by accepting work at a lower rate.

"I would therefore propose—

(A) General tariff of $\frac{1}{2}$ d. per word with a minimum charge between 9 a.m. and 3 p.m. of 8d. for twelve words.

(B) After 3 p.m. until 9 a.m. next morning, a minimum charge of 4d. for eight words, $\frac{1}{2}$ d. for each word additional.

(C) Local rate in each postal area 8 a.m. to 8 p.m. $\frac{1}{2}$ d. per word with a minimum charge of 4d. for eight words. For this service delivery would only be made by post between the hours of 8 p.m. and 8 a.m.

I agree that there should be no cheap rates for telegrams on Sundays or on public holidays. The reasons should be obvious. The Telegraph staff have not in the past received full measure of consideration in respect of their work on such days."

One speaker regretted that Mr. Lee had not apparently considered the foreign tariff, and the effect of anomalies which an increased inland tariff would probably create as compared with certain Anglo-Continental rates. The same speaker also submitted that he thought Mr. Lee had under-estimated the value of public opinion and political pressure in matters of this description, and fear was expressed that the plans of permanent officials who *did* know would be overthrown by the outside influence of a clamant

not always well-informed press and public of those who did *not* know. It had happened before.

Mr. Lee, in replying to his various critics, said he did not intend to reply to every point raised. He rather esteemed that that meeting was in the nature of a conference, the commencement he trusted of a series which would be necessary before any practical steps could be taken in the matter and the best ideas on the subject successfully evolved. He did not fear the pressure of the House of Commons or that of public opinion. With a really practical and workable scheme he thought that the public could be made amenable to the reasonableness of the project.

The opposition might need some sort of combating. He did not fear it, nor did he think anyone else need fear the result. The public would probably need educating, but it could be done, and the difficulties could be met.

J. J. T.

CORRESPONDENCE.

LABOUR AND TIME-SAVING DEVICES.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

With reference to my letter of March 14, despite Mr. Gunton's disclaimer of the 22nd idem, of intentionally suggesting in his paper that my scheme is extinct, I cannot see that an interested person could have interpreted the actual reference differently. Otherwise the query naturally must have suggested itself to him: What is the justification for appropriating an important principle from a comprehensive scheme which is under consideration and constructing thereon another and competitive scheme?

The question of the origin of the "combined processes" idea is hardly relevant. I have never suggested that I am responsible for it; but I do assert that Mr. Gunton's experimental apparatus which has enabled him to put the "combined processes" idea into practical form owes its existence to the use, unauthorised so far as I am concerned, of a modification of my patented process of vertical sorting.

JNO. H. DOHERTY.

Manchester, April 19, 1916.

TELEGRAPH TARIFFS AND ECONOMIC NEEDS

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

Those who read Mr. J. Lee's lecture on "Telegraph Tariffs" are no less fortunate than those who had the pleasure of hearing it and the subsequent discussion, and it is to be hoped that the discussion may be allowed to continue to a degree commensurate with the great importance of the subject. Mr. Lee himself expressed a strong plea for the personal interest of every member of the staff with a view to "a wide democratic discussion of all changes meditated," and every telegraph worker should undoubtedly be part of the "thinking organism" which animates the Telegraph Service. So important is this matter of the telegraph tariff that I venture the opinion that the new tariff has dealt the national telegraphs the heaviest blow to which they have been yet subjected. The taunt quoted by Mr. Lee that the "English are a nation of shopkeepers" would never have been invented for use against the national telegraph administration, for underlying the taunt was an envious recognition of England's prosperity. It is curious that a native scorn of shopkeeping should accompany the accumulation of wealth—is it due to unsuspected links, even in the least of us, with aristocratic ancestors? Our telegraphic tariff certainly appears to demonstrate a most aristocratic disregard of shopkeeping as the *Business Man's Cyclopaedia* defines it, and our lecturer gives us to infer that in fixing the telegraphic tariff, practical experience has been elbowed aside by political exigency from the very first. The great stumbling block to financial success has of course been the uneconomical flat rate of sixpence for such extreme services as are rendered by the telegraphs, and the maintenance of such a tariff for a generation of deficits seems to justify the assertion. But is this not due to an attempt to reconcile two conflicting ideals—an ideal balance sheet and an ideal national service? Curiously enough the sixpenny minimum tariff was a cumulative triumph for those who nationalised the telegraph service and who had argued that national communications should not be sold for the profit of private owners but should be worked, not as a source of national revenue, but in the expansion of national trade. A high telegraph tariff of necessity would act as a brake on commerce and a low one as a subsidy, but it is certain that telegraph revenue at the present day must suffer further diminution in rapidly increasing ratio to increases in the tariff. Higher prices mean lower sales and higher charges mean fewer telegrams. But the telegraph service with its lower and more nationally beneficial tariff—the tariff of political exigency—can become and tends to become cheap and nasty by reason of the strenuous efforts which are made to reduce the prime cost of this gift to the nation, and which must tend to reduce its efficiency and achievements. To make the telegraphs more popular—to attract customers—the service must be relatively inexpensive but wholly efficient and satisfying, and to impose upon its would-be users who practically have never known other than the sixpenny telegram (with its modifications)—who have grown up with it, so to speak—such an increase as 50 per cent. on the minimum cost and on the "economic inertia" appears to be a glaring example of bad shopkeeping, especially as there is no contingent prospect

of better value for the money! I venture to repeat a former suggestion—that the old popular and nimble sixpence be retained as the minimum fee, but for eight instead of twelve words. Reduce the quantity rather than increase the price—and so retain the elusive psychological advantage which is indicated by Prof. Chapman in his phrase that "an individual's system of demand taken as a whole tends to settle into a particular form," and by Mr. Lee himself, in his expression that "the twelve-word minimum has been crystallised." It will be observed that twelve words could still be sent for Mr. Lee's suggested eightpence, but the sixpenny minimum would without doubt retain the short-message public which wastes neither words nor money. In the case of long messages the tariffs suggested almost coincide.

As to the "distribution of the load," I believe that a threepenny urban tariff—eight-word minimum—might build up a considerable custom from non-users of the telephone, and would, of course, be met over the more economical portions of the system. The deferred or non-urgent half-rate telegram would also serve to "lower the peak" throughout the more expensive maintenance, and to copy India or our "advancing" daughter Australia, the "express" telegram could claim first place at double rate—1s.—minimum per eight words and one penny per word afterwards. But to attract and keep custom, and remembering that the machinery of modern life never stops but only slows down on Sundays, holidays and o'nights, surely no traffic but the obviously unimportant should be held overnight. Although our evening or night traffic might be mainly half-rate, a telegram—*malgré* "Punch's" telegraph messenger—is *prima facie* evidence of urgency, and a good maxim for a successful shopkeeper is surely to anticipate one's customers.

To cultivate an universal and intelligent appreciation of the time factor in telegraphy while the message is a "live" one would certainly help to popularise the telegraphs, although the acquisition of a "telegraph habit," *per contra* the "telephone habit," rather presupposes the non-existence of considerable handicaps against the former. One cannot take the telegraphs home, for instance (thank goodness!), or find it, like the telephone, immediately ready to pursue fleeting fortune or a nebulous flirtation as the whim dictates. And yet one would search the files of the world's newspapers in vain for a column or even a paragraph of "gush" over either telegraphs or telephones—they have probably compelled the recording angel to open a special department!

Maybe this comparative negation is due to the preconceived ideal of a telegraph service which—like a hereafter—forms a general perspective to a toiling and competitive humanity! Anyhow, there are many in the service of the telegraphs who are "thinking organisms" and who endeavour to realise the radical influence of their *fons vitae* in the national cosmogony. I believe it to be a fact that tariff manipulation alone will not cure the telegraphs of their apathy—but that there is far too much inherent inertia and immobility in the service itself. Costliness of course does not necessarily involve efficiency, but cheapness certainly spells inefficiency, and searching care should be taken to enlist for the telegraphs by rigid selection the best available abilities. The practice of economy can be, and is often very, expensive; and I venture to claim that more administrative attention and value should be concentrated on "live" telegrams than on "dead" ones—which is to say that (1) on "live traffic (from "handing-in" until "delivery") the "slickest" methods and the "slickest" people should be sought for and employed, and (2) on "dead" traffic the present preponderating ratio of cost should be reduced. Evaluate the "current" work—devalue the "finished" work.

The varying expressions of the community's "demand" for the telegraphs should be sought for and met. Real commercial stimuli should be forthcoming in the service itself and an answering *esprit de service* aroused and strengthened. The "atmospheric depression" due to the dismal balance sheet of the telegraphs should be for ever banished by the definite abandonment of an essentially false "ideal" of profit. The true ideal of national service should be encouraged. If the telegraphs cannot demonstrate their own importance in the national economy, limbo awaits them—inanition is always fatal. Tariffs lubricate the machinery, but they will not provide the driving power.

W. H. F. WEBB.

Central Telegraph Office, E.C.,
May 11, 1916.

PRESENTATION TO MR. F. F. LYNCH.

In appreciation of the award of the D.S.M., a fine tribute to our comrades in the war was paid by the staff of the Centre Section on April 10. A presentation and an illuminated address was made at the Holborn Exchange on April 10 to F. F. Lynch, Chief Petty Officer, of a handsome smoker's cabinet in recognition of his obtaining the D.S.M. "A token of appreciation from friends and admirers in the Centre Section, London Engineering District."

FOWLS AND FOULS.

Among the common causes of wire trouble that have been brought to our attention recently are the following. On one of the western railroads there had been a wreck. One of the freight cars was loaded with wheat and the wheat was scattered for some distance along the tracks. The birds soon found the food and they flocked there in large numbers. While one relay of birds was eating, another flock would perch on the telegraph wires. Their number was so great that the weight sagged the wires until they came in contact with one another. The crosses caused the wire chiefs some anxious moments because of the difficulty in determining the cause of the trouble. Every few minutes the wires would come clear and just as often they would become crossed.—*Telegraph and Telephone Age*.

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising	{	MR. JOHN LEE.
Committee - -		MR. J. W. WISSENDEN.
Managing Editor -		MR. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

JUNE, 1916.

[No. 21.]

TELEGRAPH TARIFFS.

THOSE of us who are still in the heyday of youth—if that term can now be applied to anyone who is not of military age—were wont to regard the telegraph tariff of 6d. for twelve words as a rigid and unalterable condition of things like the laws of the Medes and Persians. The European War has shattered many of our illusions and has demonstrated in many ways the mutability of the immutable. We, to our sorrow, have learnt that we are too old at 40, that civilisation itself is merely a veneer over the primordial passions of mankind, that State guarantees, like promises, are made to be broken and that even such an everyday need as a sixpenny telegram can be dispensed with.

In an interesting paper on "Telegraph Tariffs and Economic Needs," Mr. Lee turned our thoughts towards the question of the proper telegraph tariff for adoption when there is no more need for the emergency tariff of 9d. for twelve words. In view of the subsequent criticism, it seems clear that Mr. Lee made his chief points that every telegraph sender did not need an equally rapid service and that a differentiation of tariff was desirable.

The more one thinks about the subject, the more seems the need for an exhaustive examination of all possible alternatives. Mr. Lee advocated—though he told us that he was not wedded to his own proposal—the adoption of an urgent tariff of 8d. for twelve words and a non-urgent tariff of 4d. for twelve words. Mr. Newlands thought a higher minimum of 8d. for twelve words between 9 a.m. and 3 p.m., and 4d. for eight words at other times would be preferable. But these are not the only alternatives. Mr. Lee's difference in time of half an hour between urgent and non-urgent messages may not result in a sufficiently high percentage of urgent telegrams. Mr. Newlands' proposition, though suitable for

London, might be less suitable for other places—say for instance that northern town of which Mr. Lee spoke—where they send telegrams principally in the sleepy hours of the early morning, thus making the whole day miserable with thoughts of the sixpences which have been "banged." Again the question arises whether the telephone express letter service should be abolished in favour of the cheaper telegram or whether it would suffice if the rates were equalised; also whether, if differentiation of rates be decided upon, much alteration in the telegraphic machinery will be involved, with consequent multiplication of forms and complication of accounting, and how such alterations can best be avoided.

These and many other practical points will occur to those of our readers whose duties bring them into close touch with the work. Their passing thoughts will in many instances contain elements of real value in the consideration of the question and we ask such readers to communicate them to us in the interests of the great Service we all love.

DUBLIN.

"PUBLIC telegrams may now be accepted for Dublin and its neighbourhood at sender's risk." Thus runs the official intimation which was distributed on May 10. It marks a stage in the tragedy of the long telegraphic severance of Dublin from the main organism. The telephones escaped. Their happier fate is assigned by the newspapers to the quick wit and inventive genius of a passing "woman,"—*splendide mendax*. Whether or not the story is true we have no information, but the story of the history of Dublin telephones in those grim days, which we have gathered from official reports, is a thrilling chapter of incident and an inspiring account of bravery and devotion. We are entirely in the dark as regards the telegraph happenings, beyond whispers of splendid engineering and traffic accomplishments in the work of restoration and a story of prompt action on the part of officers at the moment of crisis. But even on this slender amount of information we cannot let this sorrowful incident be unnoticed. The destruction of an office where many of our brethren have spent a considerable portion of their lives is an event which has its special poignancy in any circumstances, but we can understand that the attendant circumstances have a poignancy for our Dublin brethren which we cannot attempt to indicate. The telegraph brotherhood has known many sad severances during this war, but none so terrible in its implications as that which occurred on the Easter Bank Holiday of 1916.

It is not easy to make even a tender and brief reference to the subject without entrenching on the domain of public discussion. With that public discussion we are not concerned. We write not as citizens, but as brothers of the craft. Time will have its revelations to make, and many mysteries will be made more clear. But officers of the State cannot well ignore the various disturbing suggestions which have been made by the newspapers. To all of us it is a sad experience that such suggestions should be made. We are disposed rather to welcome the restoration of the intimate connexion which telegraphy affords and the more intimate relationship of which it is the symbol. Our Irish brethren will accept, we trust, the deepest sympathy of their English fellows

in the sorrow which has overwhelmed them. It is for us to strive by more closeness of understanding and by conquest of prejudice to restrict and restrain those differences which stand in the way of progress.

THE INTRUSIVE COMMA.

WE have more than once remarked that however disputable the principle of State ownership of telegraphs and telephones may be—and the subject is still productive of a constantly increasing mass of literature in America—there can be little doubt of its desirability in times of national crisis. An interesting confirmation of this view is to be found in the report (according to the *Daily Mail*) that the United States Navy Department arranged to take over all wireless, telegraph and telephone services, and to operate them from four o'clock on a certain Saturday afternoon until the following Monday morning, “ostensibly as a war test.” This, of course, was during the days when the reply of the German Government to President Wilson's latest note was still awaited, and the outcome of the negotiations hung in the balance. We have not yet heard what success attended this experiment. The New York correspondent of the *Daily Mail* says: “Never before has anything of the sort been attempted, and the experiment is regarded by many in a position to know much as was the mobilisation of the British Fleet in July 1914.” We rather suspect that an intrusive comma after the word “wireless” has innocently enlarged the scope of the American Government's experiment. While the assumption of the wireless service during a week-end is practicable, we doubt whether the control of the vast telegraph and telephone system of the United States could be undertaken so lightly. There is much virtue in your comma.

HIC ET UBIQUE.

WE confess that we are gratified by the thoughtful and sympathetic leader which appears in the *Postal and Telegraph Record* on the subject of Mr. Lee's paper. The concluding paragraph of the article runs as follows:—

“The present is a most opportune time for dealing with a problem which has beaten generations of administrators. In the near future, as the author pertinently points out, the Telegraph Service will have to play a part in the rebuilding of our national industry. Whether that part will be helpful or otherwise will depend upon the Post Office being able to adapt itself to the requirements of the nation. If the old policy is to be persisted in, if the old idea of making the telegraphs “pay” is to be retained, if the needs of the public are to remain a secondary consideration, the Post Office will fail the country at a moment when the failure may have far-reaching consequences. If, on the other hand, the Government, or the Treasury, or the Postmaster-General—or whoever is now the obstruction to progress—can be persuaded to recognise the fact that the success of the telegraph service cannot, from a public point of view, be measured in terms of pounds, shillings and pence, there may be a possibility of getting something done in the way of real reform. . . . We sincerely trust that Mr. Lee's views, based as they largely are on the experience of administration, will be given as cordial a reception by his superiors as we have been glad to give them.”

THE transfer of the telephone exchange at Portsmouth from manual to automatic working was successfully accomplished on April 29.

The exchange has accommodation for 5,000 lines, with an ultimate capacity for 7,000, and is by far the largest full automatic system in the country. The actual number of lines involved in the change was 3,356, and the cut-over was completed in a few minutes, practically without interruption to the service. The equipment was provided by the Automatic Telegraph Manufacturing Company, of Liverpool. Much valuable work was done by the Engineering and Traffic Staff at Headquarters in carrying through these arrangements, and by the following officers in the district, who received special commendation: Mr. J. S. Brown (Executive Engineer), Mr. L. F. Morice and Mr. A. Bates (Chief Inspectors, Engineering Establishment), Mr. W. Howe (District Manager) and Mr. S. O. Allen, Traffic Superintendent (Southampton).

THE French Government has drawn up a bill providing for the outlay of 120,000,000 frs. on telephone improvements. The construction and equipment of six large new exchanges in Paris, the enlargement of three existing exchanges, the introduction of new multiple boards for 12,600 lines, the installation of automatic meters, and the laying down of subterranean trunk lines are amongst the proposals involved in the scheme. We are glad to think that the development of the telephone in Western Europe will not stand completely still during the war.

MR. LUIS JACKSON, of Montclair, N.J., sends us particulars of a new emergency telegraph code which consists of all dots and no dashes. He claims that one can become more conversant with his code in one hour than with a week's study of the Morse code. His idea is not to supersede the Morse code, but to place in the hands of the general public a system whereby every person can quickly express thought over wires or by sounds. The code is as follows:—

Group 1	A	B	C	D	E	F				
	1|1	1|2	1|3	1|4	1|5	1|6				
Group 2	G	H	I	J	K	L				
	2|1	2|2	2|3	2|4	2|5	2|6				
Group 3	M	N	O	P	Q	R				
	3|1	3|2	3|3	3|4	3|5	3|6				
Group 4	S	T	U	V	W	X				
	4|1	4|2	4|3	4|4	4|5	4|6				
Group 5	Y	Z								
	5|1	5|2								
Numbers	1	2	3	4	5	6	7	8	9	0
	1|	2|	3|	4|	5|	6|	7|	8|	9|	3|3

Thus, 1 stroke, space, 1 stroke, indicates A; 4 strokes, space, 5 strokes, W; 5 strokes, space, 2 strokes, Z, and so on. The ordinary code dash varies in length according to the individual operator, whereas the sound of the dot is direct and clear.

There are passages in Mr. Jackson's circular which baffle us. He alludes to a “green man at the other end.” The only Green Men in this country are to be found in tavern signs, where they are usually associated with a Still, an association as mysterious as that of the Goat and Compasses. He says also that the code can be used by boy scouts wig-wagging. We had not known that American boys wagged their wigs, but imagine that their locks must be more luxuriant than those of their British cousins if they can be used for signalling purposes.

ONE of the first soldiers, says the *Daily Chronicle*, to fall in the Sinn Fein rebellion was a sergeant, who dashed, with a little company, into the post office when the raid was made. He was shot in the head; and a telephone girl, who hails from Scotland, bravely refused to obey the order to quit, insisting upon remaining to bandage the poor man's head. She saved his life.

WE notice in an advertisement at the end of the *National Review* for May that *The Outlook* has adopted a novel tariff. The subscription rates are given as follows:—

	One year.	Six months.
Inland	£0 14 0	£1 8 0
Foreign	£0 15 0	£1 10 0

Does our contemporary think that the war or the world will end before the expiry of six months?

To-day in its issue of May 6 gives a good example of the true word spoken in jest. "The chief advantage of the automatic telephone exchange," it says, "appears to be that a subscriber can get through to the wrong number without the help of the operator." On the other hand, the disadvantage is that he has the inadequate satisfaction of having only himself to visit his wrath upon, whilst with a manual system there is always the administration to curse and the operator to blame.

THE wood block of 1877 illustrating the article "Telephone Records," was incorrectly described as illustrating the first telephone circular issued by the Post Office. The circular was actually issued by the Bell Telephone Company.

THE following is a copy of a complaint received from a Liverpool telephone subscriber in 1896. It may be taken at will either as a specimen of the reproof epistolary in the 'nineties or as documentary evidence that subscribers did sometimes complain even in the golden age:—

Dear Sir,—From motives of delicacy we have refrained from troubling you this last day or two in re our telephone, but it is behaving badly again. Will you send down as soon as possible one of your staff to see what he can do for it? As it is a horrible old instrument and we are in despair about it, please see and send down a bright cheery optimist—such as the last two or three you have sent. A middle-aged man of experience would break it up with a hatchet, but a bright youngster is not particular about holding out delusive hopes for the future, and this is the man we want. No other can give us such comfort—and disappoint us so badly as events turn out.

P.S.—If you have a prize for the oldest and worst telephone kindly let us know—we would like to enter ours.

TELEGRAPH TARIFFS AND ECONOMIC NEEDS.*

By JOHN LEE.

WHEN Barrère, before the National Convention, described the English, in a phrase afterwards immortalised by Napoleon, as "a nation of shopkeepers," he meant, no doubt, to be unpleasant. He meant to cast a stigma upon us. Even British thinkers have felt a touch of shame in this matter of shopkeeping as though they all lived in the suburbs. Adam Smith protested that "to found a great empire for the sole purpose of raising up a people of customers seemed, at first sight, to be a project fit only for a nation of shopkeepers." There is something unworthy in this scorn of the shop. When the nation as a whole sells something of value, say, telegrams, it is afraid or ashamed to press its sales. It shrinks from the consideration of the buyers' needs and it dreads the cultivation of the persuasive arts. "To things of sale a seller's praise belongs," is Shakespeare's aphorism, but the active fostering of salesmanship seems to be a worthier aim than the passive waiting, with folded hands, for customers. Passive salesmanship is mere philanthropy: it supplies needs but it does not create needs. "Doing good, disinterested good, is his trade," as Cowper puts it in *The Task*, which is to say that the salesman is not doing business at all, he is merely "obliging a customer." To-night I want us to decorate the telegraph shop-window. Like other shop-windows it has become a little darkened and depressing. I propose that we shall consider

what telegraphic goods we shall sell and at what price we shall sell them, not as philanthropists, but as business men who are desirous of extending our business. There was once an ironmonger, and a shortsighted customer came into his shop and asked for a Greek New Testament. "Certainly, sir," he said to the customer. To his assistant he said, "Go and borrow the vicar's."

Everybody wants, at every moment of the day, to send a telegram—provided that two conditions are met. We must suit his ability as regards price: we must suit his need as regards service rendered. Singularly few commodities are sold at an uniform price with wide variations in the utility to which they are put. The twopenny tube soon discovered the fallacy which underlies the flat rate doctrine. Even the penny letter had to be adapted to the large consumer who wished to send printed matter by post, and recent postal history has revealed to us the difficulties, even in war time, of adopting the uniform penny rate. The telegram is probably the most extreme instance of variant services for the one fee. If I am afraid to go home in the dark it costs as much to say so by telegraph as to buy the words and music. If I buy large cargoes of precious stones (which I frequently do) at the uttermost ends of the country, it costs ninepence similarly. A curiously disinterested Post Office charges the same for the use of a cable to Ireland as for the use, for the purposes of telegraph transmission, of a local telephone circuit. This variation in service is complicated by the delivery concessions whereby messages are delivered for the same original charge at distances up to three miles from the delivering point and sometimes further. In short the uniform tariff seems to be most acceptable to that class which lives on the edge of the boundary of the free delivery. Their chiefest joy is to see the messenger pass the door and to reflect that one of their neighbours will be compelled to pay portage. It is an element in neighbourly affection.

This puts the unfavourable aspect of an uniform tariff at its worst. At its best the uniform tariff has the advantage of simplicity and directness. And there is something to be said for the idea that, after all, sending a telegram is sending a telegram, it is adopting the unusual means and the expensive means of transporting ideas, and for the idea that the seller of a telegraph service is not concerned with the use to which it is put whether the trivial use of preventing the spoiling of a dinner or the majestic and meritorious use of backing a race-horse. But this argument carries us too far. It is responsible for the awe with which the arrival of a telegram is regarded, except by bookmakers. It is applicable to any charge. Lord Cromer showed the House of Lords a few months ago that a certain telegram was well worth £495. A telegram at a sovereign would fulfil vital economic and social needs. All of us in this room might, at times, use such a gilt-edged service, though I am afraid we should do it with tears and fasting—especially with fasting. But our function is to extend the use of the telegraph. We wish to make this apparently unusual means of communication into the normal. So we have to discover what differentiations are practicable in the present stage of telegraph history to widen the utility of the telegraph service, to adapt variant types of service to variant needs, and yet to retain something of simplicity and directness in the method of charging. Each person pays the charges for his own telegram, save in the case of lawyers who, like little birds, pick them up in their bills. We need to make the service attractive to the community at large. We set out so that each of us on rising will consider to whom the day's telegrams are to be sent. In Aberdeen they send them before rising, at least so I judge by the fact that there is a rush of fish telegrams soon after 7 a.m. It is the only explanation I have of the curious Aberdeen peak.

If we are to establish the arguments not only for a new tariff but for a new fundamental basis for that tariff, we shall need to examine the economic principles which govern the equilibrium of supply and demand, and apply them to the supply of a telegraph service and the demand for it. Supply will be governed, as all supply is governed, by the cost of production. In every case of estimating the cost of production all sorts of complications enter, and they are examined minutely in the text-books on economics, notably in the great work of Professor Marshall. Unfortunately for us telegraphs have one complication which has always been overlooked. A Government telegraph service is bi-functional. Not merely does it convey telegrams from individuals but it performs military and other services on behalf of the State. The English service provides coast communication; it acts in the place of a system of national defence telegraphs; in Ireland it transmits police messages, and in a hundred ways in the country as a whole the service steps beyond the ordinary functions of the transmission of telegrams on social and economic business. So far as it performs this national function it cannot produce a proper balance sheet. There is a consumer's surplus in England which applies advantageously even to the person who never sends a telegram. The Irish farmer who never paid for a telegram in his life benefits from the fact that the police are able by means of the telegraph to discover his stolen cow. And we, living in security on an island, have all the priceless benefits of the coast communication scheme which is performing a valuable national protective service even when the wires are idle and no tangible service, so to speak, is rendered. Forty years ago a leader writer in the *Times* protested that "an English ruler, looking upon himself as the minister of the race he rules, must engage in nothing that will not produce an income sufficient to defray the interest on its cost." It is not an unpopular argument and a Retrenchment Committee recently re-cooked it for general consumption. "The telegraphs must pay," it said, possibly unaware that Professor Marshall showed that it does not take into account the fact that the consumers might benefit so much by the low price of a certain article as to outweigh the disadvantage of the enterprise failing, as a whole, to make a profit. There are many cases in point, such as salt in India, and education everywhere. And telegraphs come under the same heading. At a suitable tariff there might be such an increment of consumer's surplus, such an advantage to the

* A paper read at the London Telegraph and Telephone Society, April 18, 1916.

world of interchange and barter, that the apparent (and it is only apparent) failure to make a profit on the business as a whole would be of little account, in comparison with the benefit to the community as a whole. It is not to the sender or receiver of the telegram a "particular benefit" as described by the text-books. The village grocer who can seize a favourable opportunity to purchase a stock of bacon at a low price benefits not merely himself, nor the trader from whom he buys, but the whole community of his customers and also the customers of his hated rival. Indeed we must remember that in our service there is and is likely to be another consumer's surplus. The new Press tariff which comes into force next year will hardly be remunerative, but every citizen will benefit by it, so that our service really is trifunctional, it transmits telegrams for individual members of the community, it provides for national defence, it distributes information which becomes the enlightenment of the democratic community. You have heard recently of the enormous waste which this Press service entails, but I confess to a sense of shock on reading in the *Newspaper World* that one newspaper in a week in October last received 204 items of news in duplicate from two agencies. With all our anxiety to increase telegraph traffic such waste is beyond defence, and we can only hope that the new Press tariff will discourage it.

I confess that if it were practicable I should like to see the two national functions translated into a cash credit. It is an irony of fate that, owing to this confusion in the functions of a Government telegraph service, only a great private telegraph company, such as the Western Union Telegraph Co., of the United States, is able to provide a strict balance sheet and one of the consequences of this advantage is that it cannot give a service to small towns and villages, since that service would be unremunerative. It is at this point, I think, that Mr. Vail's recent arguments are best answered. The dichotomy is not between State ownership on the one hand and private ownership on the other. It is between a service which cannot show a cash credit for the services which it performs and a service which can insist on a cash credit for all its functions. I believe that the prime need of our service is a balance sheet in which every member of the staff might be interested, so that we might have a wide democratic discussion of all changes which might be meditated. "Callisthenes" of Selfridge's passed one day from the praise of umbrellas to the contention that each person in the employ of Selfridge should be part of the thinking organism. To my mind enlightened administration will wish to act not by force but by persuasion, and there is something repellent in the idea that as a consequence of performing invisible functions our present balance sheet does not fully reveal the financial success or otherwise of our work. But we can proceed to discuss the fundamental theories which apply to telegraph tariffs without demanding such a revolutionary change; we can keep a broad view of productive cost in our mind, without permitting functions which have no relation to profit-making, to govern the tariffs which we propose.

"The ultimate regulator of all demand is consumer's demand," says Professor Marshall. If we are to be scientific shopkeepers we must set out to increase the demand for the commodity which we supply. So we must tackle the problem in the true method of economic science by finding out at what points lie the values which would modify the marginal demand. Put differently we want to remember that "that part of the thing which the purchaser is only just induced to purchase may be called the marginal purchase," or as Professor Taussig states it, "The consumption of every commodity is effected by its price. A rise in price checks purchases, or a fall in price stimulates them. Though it would appear that people continue to buy simply what they are used to buying, this is only true of buyers who are above the margin—those who have been enjoying a consumer's surplus. There are always some just on the margin to whom at the ruling price the purchase is just worth while, and conversely, when price falls, there are always some additional purchasers." What we have to do is to discover in what way we can enlarge the number of marginal purchasers. How can we proceed so that the thousands who never send a telegram may be raised suddenly to the class who may find it just worth while? We shall consider it purely from the point of view of the consumer, safeguarding ourselves by remembering that the question of productive cost is a matter for separate study.

"The element of Time is the centre of the chief difficulty of almost every economic problem." It is one of Marshall's most sweeping statements, and it applies very peculiarly to Telegraphs. It is Time which we are selling. If time is of no value then telegraphy is of no value. Now it is exceedingly difficult to evaluate time. I dread such morality as that of the Earl of Chesterfield who bade his son to seize and to snatch every moment of time. It seems to me that the long slow hours of idleness, when reflective thought has its opportunities, have their value above the hurrying and restless busy-body hours, seized and snatched with feverish fingers. Visible idleness is often misleading: I have known even telegraph supervising officers who have misunderstood the reflective pause. I knew a telegraph supervisor once who rebuked a subordinate in these words "Why aren't you doing something?" "There is nothing to do," replied the telegraphist. "Look at Mr. Smiles," said the supervisor, "He's always busy looking for something to do." Some of us know these unrecognised descendants of Lord Chesterfield. But in spite of complexities there are valuations of time-snatching which are roughly trustworthy. Local transit is one of the best valuations. It costs me threepence for a tram journey to my suburb. Thus I pay threepence to save, not my feet, for I would much rather walk, but to save about an hour's time, that is, of course, when I get a reasonably fortunate journey. Local transit of ideas is proved to have much the same value. It is now evident from the traffic that the public regard threepence as about the marginal value of a call office telephone call in London, though it is doubtful if the telephone traffic at a call office fee of threepence would have held up if it had not been for the increase of the telegraph charge to ninepence. It is equally evident from experience with the telephone express message in London that

there would be a demand for a local telegram at much the same price. If we take the cost of delivering a written message in the daytime in London as one penny, we see that a local telegram at fourpence is not wide of the mark. It is beyond question that in urban districts generally such a tariff would meet the needs, largely social, and that it would be close to the marginal price. The conversation has its special functions which the written message cannot fulfil, and the written message also has its special function carefully to be distinguished from the value of the spoken word. It is not a new thing. There were local telegrams in the days of the London District Telegraph Company, and the attempt to unify telegraph tariffs in 1870 has had several unhappy influences, chief among them the unfortunate discouragement of local telegrams.

It is equally certain that a fourpenny tariff would not meet the cost of production if it included the whole of Great Britain and Ireland and the adjacent isles. What, therefore, should be the extra-urban tariff? I doubt if it is possible to differentiate at 100 miles, though I am confident that we ought to do so. The sixpenny tariff has left us a tradition which prevents any considerable increase for long distances. It is distance which lent enchantment to this tariff, unfortunately. So I am afraid that we shall have to depart from sound economics in respect of those telegrams to distances extra-urban but within 100 miles. We have learned much from the ninepenny tariff. We have learned that for general purposes it is too dear, that it bears peculiarly heavily on social and afternoon traffic, that it has hit the small trader very badly, though the small trader is one of the most valuable features of our economic system. It is perhaps doubtful if the fall in traffic is ascribable solely to the ninepence itself or to the general spirit of economy with which we have been inoculated somewhat against our wills, to the transfer of industries from commercial enterprise to the manufacture of munitions, or to the limit on industry occasioned by the large withdrawals of labour. On the other hand it is probable that the uncertainty of the railway service and the inevitable depreciation of the postal service have added to the telegraph traffic, and that this is the cause of our present abnormal evening work. We have also learned that small towns feel most the increase in the charge, and that there is a wider variation between the traffic on one day and on another day than with the sixpenny tariff. With ninepence there is a much more serious economic inertia than with sixpence, and as a consequence the traffic comes more in sudden rises than formerly, and consequently is more difficult to handle. To find the marginal figure we shall need to come below ninepence, but not much below it since we are providing a local service for fourpence. Hence all indications point to eightpence as the marginal value. But here we must be safeguarded. It is quite possible that in normal times we shall be able to give something more for eightpence than we now give for ninepence, in other words, we shall be able to give a quicker service and thus to annihilate time, the telegraphic enemy, rather more successfully. Of course an objection is raised at this point. A differentiated tariff on these lines would give an advantage to the local trader. With a fourpenny London tariff one might rather give an order in Croydon than in Aberdeen. This, I contend, is as it ought to be, and it is an argument in favour of differentiation both at 100 miles and at 200 miles. While telegraphs check the disadvantage of distance they only check it and do not annihilate it. Local trading with its cheaper railway freight and other advantages is to be encouraged, and an uniform telegraph tariff suffers from an additional disadvantage in failing to realise the fact. And while it fails to realise the fact the telephones stake their very existence upon it. There is a curious passage in Gibbon's *Decline and Fall*. "Ceylon," he says, "was divided between two hostile princes, one of whom possessed the mountains, the elephants and the luminous carbuncle, and the other enjoyed the more solid riches of domestic industry and foreign trade." It will be a sorry day for industrial communications if a future writer on the "Decline and Fall of Telegraphs" has to say that the telegraphs had to be contented with the elephants and the luminous carbuncle while the telephones got the trade.

But in the process of meeting economic need we are only at the beginning. We have brought considerations to show that a broad differentiation in distance charge is needed. Now we must consider the differentiation in quality of service. There is a second aspect to the marginal theory. Not only is there a certain figure at which there may or may not be a purchaser, but there are differences in the product, and these differences may correspond to different marginal schedules. The evening telegram which is in ample time, in spite of the Earl of Chesterfield, if it is delivered the next morning, may be above the marginal line at eightpence, and so we need to discover in what way we could provide a cheaper telegraph service for those consumers whose economic needs would be met by a less rapid service.

All modern economic thought points to the desirability of using plant at off-periods to produce goods of second quality. This principle, which is called the "load factor," is coming to be more widely recognised. A very able analysis of this theory appears in the *American Economic Review*. It shows that in electric lighting, transportation, and above all in telegraphs and telephones, it is essential that the peak-load should be balanced by reduced charges at other times. This was first enunciated in England by Mr. John Hopkinson who wrote, in connexion with the Metropolitan District Railway, that it "must be prepared to bring in its thousands of passengers to the City at the beginning of the day and to take them back in the evening, and for the rest of the day it must be content to be comparatively idle. The line must be of a carrying capacity equal to the greatest demand, and if this be great for a very short time the total return for the day must be small in comparison with the expense of rendering the service. In such a case it would not be inappropriate to charge more for carrying a person in the busy hours than in the slack time, for it really costs more to carry him." The measured service rate in telephone charges is

incomplete until it recognises this load factor, though I need hardly say that there are enormous difficulties in the way.

There can be no doubt that we could give an afternoon service of the deferred type and thus not only fill up our wires but also help in giving better attendances to the operating staff, and in addition help us to use the messenger force to better advantage. These three points are of more importance than appears at first blush, since the ninepenny tariff, as we have seen, produces wider variations in traffic between one day and another than the sixpenny tariff, and unless we fill up the gaps with secondary traffic the old historic difficulties which the administration of telegraphs has always had to face will be accentuated. And to fill up the gaps will be all the more necessary when, in order to carry the purely commercial traffic more efficiently, we have to equip modern telegraph plant on a wider scale.

In short a great many of our administrative difficulties would be overcome if, in addition to the telegraph traffic at eightpence for a minimum of twelve words, which would be our primary care, we had a secondary tariff at fourpence for a minimum of twelve words, the further charge of a halfpenny a word applying to both classes. Telegrams of the secondary class could be handed in at any time, but I think it likely that they would not be telegraphed until after the morning pressure, while they would be delivered, either by messenger or by postman, as circumstances permitted. It might be desirable to fix a time-limit, say, 30 minutes, at which in the afternoon the fourpenny telegram would be handled in sequence with the eightpenny telegram. That is an urgent telegram at 2 p.m. takes turn with a non-urgent at 1.30 p.m. The delivery of the non-urgent might be in the form of beats or walks when the messenger is delivering an urgent telegram, but I think the secondary class would probably be delivered immediately in those cases where delivery is accepted by telephone. The telephone subscriber must be the favourite child of the telegraphic family, and he will ask for more definite recognition than the state visits of the canvasser or the addition of our beautiful pamphlets to his library.

It is quite possible that such a differentiation in the tariff might attract to the lower figure of fourpence some telegrams for which ninepence now is paid. If that proves to be the case we are guilty now of economic waste in providing something for which the customer has only a partial need. We are making him buy an extravagant article because we refuse to meet his need. He wants a bicycle: we compel him to buy a motor car—or walk. And all trade, from the weaving of fabrics to the publication of novels, has developed by means of efforts not to draw the public by force to the arbitrary price but to supply an article sufficiently good at a more moderate price. Secondary trade does not in the long run destroy the primary trade. Rather it builds up the primary trade. And a widespread use of the fourpenny telegram ultimately might bring with it an increased use of the eightpenny. The man on a bicycle longs for a motor car much more keenly than the pedestrian.

Even apart from these considerations there is much light to be obtained from a glance at the principles which govern railway rates. By the action of the Inter-States Commerce Commission in the United States, the differential theory has been raised to a doctrine. The differentiation in railway rates for different classes of goods is based upon the necessity for using the plant to the utmost. "Some items of traffic," as Taussig states the case, "will 'stand' a heavier charge than others; that is they will continue to be offered even though the transportation charge be high. Other items will 'stand' only a low charge; that is, they will not come unless the charge be low." That is the simple doctrine which we need to apply to telegraphs. Ideally every railway train ought to have as many cars as the engine can draw and every car ought to be loaded to its full capacity. It is an impossible ideal, with scheduled times and other difficulties, but railway management will always aspire towards it. There may be some subtler accompanying ideal as, for example, that of the Prussian State railways which encouraged export trade by charging less for the transit of goods for export. But in the main the object is to get the fullest utility out of the plant and to charge as a rate "what the traffic will bear," if the traffic is to be attracted.

It is a curious fact that in the discussion of the Government ownership of telegraphs, half a century ago, the most enlightened economist of the time questioned the ability of public officials to control a business with large capital. He laid down as the first of his fundamental rules that there are four conditions which must govern any enterprise which is to be controlled by public officials: (1) it must have a small capital; (2) it must involve only routine operations; (3) it must tend to co-ordination with other similar services; (4) it must have a single and all-embracing plant. Why was William Stanley Jevons so distrustful of the public official? Because he believed that public ownership tended to be so inelastic that it might fail to make the best use of expensive plant and hence he laid down the doctrine that the plant must be comparatively small in value. Looking back over the half-century I am afraid we must say that Jevons had some reason for his faith. The able men who have ruled the telegraphs have been tied hand and foot by an uniform tariff. Their advice was neglected on the one occasion when it was tendered with the knowledge of the public and when there was an opportunity for reform.

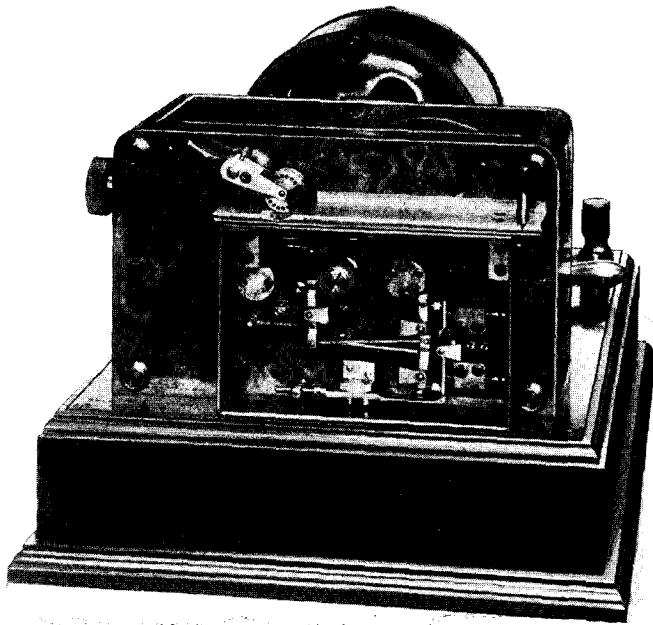
Hence it comes that if we are to be as alert in the application of economic science to our craft as in the application of electrical science we need to correlate plant costs with apparatus costs and staff costs. An office like Aberdeen is bound to have far more expensive plant in the shape of long wires and high speed instruments than a centrally-situated office like Leicester. So that it is clearly unsound to lay down precisely the same conditions to both offices. But, even making due allowance for all that can be done in this direction, I see no chance of a remedy for the vast amount of idle and insufficiently-used plant which we have at present other than the remedy which other similar industries have had to adopt, and that is to cultivate secondary traffic at a lower cost. We need to fill up our wires and to extend the productivity of our

plant by catering for traffic which will only "stand" a low charge. To quote Taussig again, "Most of the expense involved in carrying [the secondary traffic] is incurred anyhow; it is involved in the general or joint expense of building and operating the railway. The only way to get the full utilisation of all this labour and expense is to fix the rates in such a manner that the transportation shall come." So we shall have to teach the public the value of a cheaper service, not as a rival but as an auxiliary to the more costly service. This is the central principle which I am urging, and that central principle is applicable to all sorts of varying arrangements of tariff. The tram conductor was a genius in economics who replied to a lady on her complaint that he trod on her toes with his clumsy feet, "What do you want for a ha'penny a mile?—Pavlov-er?" She realised, at once, the advantages and the slight disadvantages of the cheaper tariff. To have her dainty feet secure she must use her own car.

We have reached, therefore, a fundamental basis for our telegraph tariff. We can postulate, as a beginning for discussion, two kinds of telegrams, the major class at eightpence for twelve words plus a halfpenny a word, the minor class at fourpence for twelve words plus a halfpenny a word. I confess that I am much more concerned with the principle of differentiation than with the mere question of eightpence and fourpence, but I fix these figures in order that I may crystallise the idea which I am urging. The two classes will also represent a difference in quality. The former will be dealt with urgently throughout, it will be the limited express of telegraphy. The latter will fill up the lines, will fill up also the time of messengers or will be delivered by post and will be the ordinary third class parliamentary telegram. It is obvious that the longer the telegram the smaller proportionately will be the difference in charge, so that for very long telegrams the sender will be tempted to pass the marginal limits and to pay the additional fourpence for speed in transit and promptness of delivery. There is a second distinction in that the secondary class, in its aspect of a local telegram will be handled as a primary class telegram in London and in other large urban districts. The central object of this scheme is, of course, to cultivate the telegraph habit, and to encourage the public to send telegrams of the minor class, and to pass from that to the appreciation of the major service. There is a striking sentence in Prof. Chapman's book on *Political Economy*, an admirable little treatise. "We must always remember, not only that an individual's demands are the outcome of his upbringing and his surroundings as well as of his independent individuality, but also that an individual's system of demand, taken as a whole, tends to settle into a particular form. Some appreciable shock is needed to shake it out of this form." I propose that the proposed tariffs shall apply this shock. I propose that we strive to overcome the appalling inertia which our telephone brethren have succeeded in overcoming. "Habits make us all their slaves," and in the choice of masters one might as well have the telegraph habit to accompany the telephone habit. Indeed, habits—like mortals are better in pairs, and it is, I think, a worthy aim to suggest something which will rob the orange envelope of its dreadful association in the public mind with deaths and calamities. I want it to be a harbinger of joy, such as even an advertising agent might wish to scatter over the earth.

I propose, too, that the secondary class shall take the place of the night telegraph letter, and that the concession be extended to all telegraph offices instead of limiting the privilege to a small number of towns. Thus the utility of the service to the public at large would be a balance for the reduction in the number of words acceptable for 9d.—22 instead of 36. It is quite possible that modifications in a postal service which before the war was almost extravagant in its enterprise will make such a system of general night telegraph letters into a service of increasing value to the community. Between 8 a.m. and 8 p.m. the secondary class telegram might be delivered by messenger, on one of his rounds with a primary class telegram, but after 8 p.m. I suggest that the missive invariably be held over for delivery by post the next morning, except in its form of a local message in urban districts. On Sundays and official holidays I would give the primary service only, and I would suspend the fourpenny telegram save in its aspect of a night telegraph letter, i.e., if handed in it could only be delivered by post the next morning. There are other details to which brief reference is necessary. The multiple copy rate might be so modified as to give some rebate to large consumers who hand in thousands of telegrams at a time to one town. Hitherto this has been used particularly by touring theatrical companies, but it might become a useful advertising medium for bargain sales and the like, which now seem to depend upon more or less beautiful pictures of Greek goddesses. Even a telegraph form would be more alluring than some of them.

In this direction we shall need to proceed, I think, if the telegraph service after the war is to take its proper place in the machinery of transport, and if the charges are to be based on something more nearly like sound economic doctrine. Even so I am convinced that the minimum of twelve words is not altogether sound. A system whereby the message is paid for and then a word-charge is superimposed is altogether preferable. It has the enormous advantage of catering for brevity. But we cannot in this life have perfect philosophy turned into fact. Even the Athenians grew weary of calling Aristides "the just," and ultimately banished him. In our own sphere we have to bear with the imperfections of the twelve-word limit, and one of its most unfortunate features is that we lose the advantage of the three or four-word message and commercial firms do not avail themselves, as they might, of scientific methods of abbreviating their telegrams, such as the use of code. Even this is not without its bright side. Ten-letter codes of the modern type are very difficult to telegraph, and recent tendencies in ocean telegraphy indicate a very decided preference for plain language at greater length. However, the discussion need not trouble us beyond an incidental reference. The fact is that the twelve-word minimum has been crystallised, and it would almost be impossible to break so abruptly from the past as to devise a tariff which would charge



GELL MOTOR-DRIVEN WHEATSTONE MORSE TRANSMITTER

Supplied to any suitable voltage for D.C. or A.C.
Steady running, wide range of speeds, firm contacts.

MANUFACTURERS OF

Landline, Cable and Wireless Telegraphic Apparatus.

REGISTERED OFFICES:
Gell Telegraphic Appliances Syndicate,
Sardinia House,
Sardinia Street,
Kingsway, W.C.
Telephone: Holborn 6826.

WORKS:
Gell Telegraphic Appliances Syndicate,
Pine Grove Works,
Tollington Park,
London, N.
Telephone: North 1196.
Telegrams: "Gelltas, London."

EBONITE.

TONS of **SHEET, ROD and TUBING** in London
Stock in various Qualities and numerous Sizes.

EBONITE-VULCANITE owing to its special nature,
can only be made **successfully** after many years of experience.

We have been manufacturing this Material for
OVER 60 YEARS.

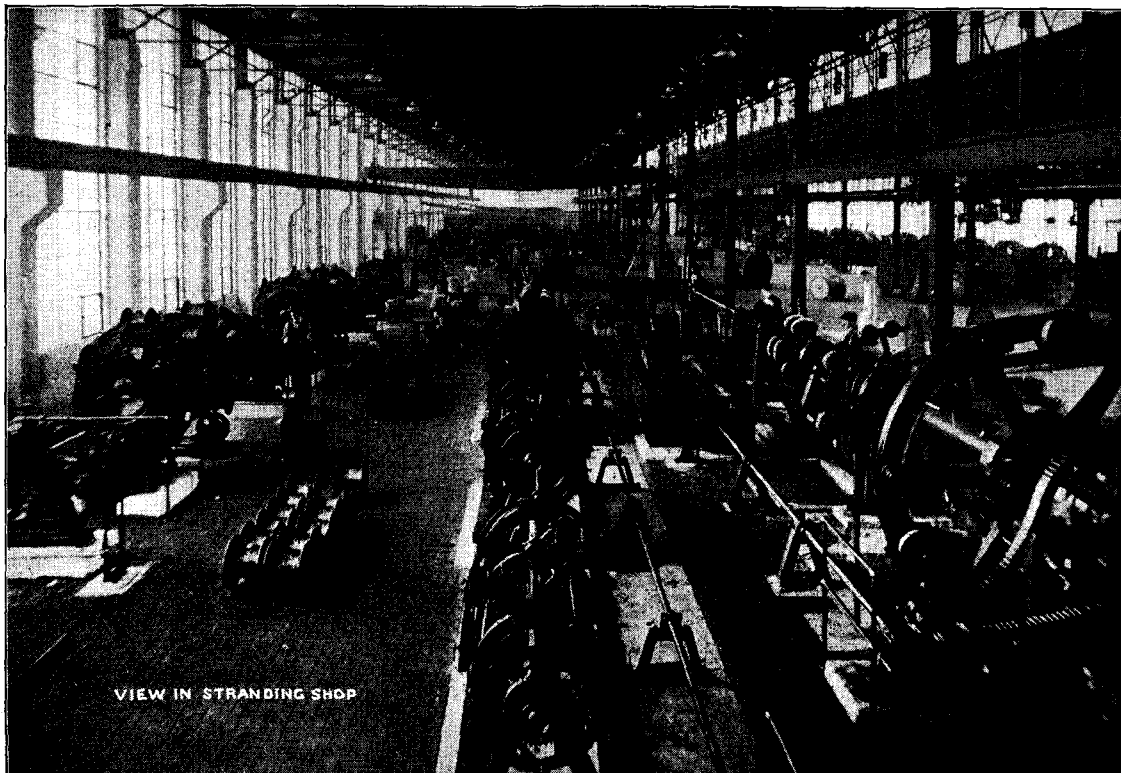
AMERICAN HARD RUBBER CO.,

13a, FORE STREET, LONDON, E.C.
"EBONISETH, LONDON." CENTRAL 12754
Head Office: 9-13, MERCER STREET, NEW YORK, U.S.A.
Factories: Akron, Ohio. Butler, New Jersey, College Point, New York.

Silk and Cotton-Covered H.C. Copper Wire.
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
"ORMISTON, LONDON." 13259 CENTRAL.

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction, Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital).

Telephone: 1309 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3s. 6d. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses - - - - - **3 6**

Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames - - - - - **7 6**

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE, WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

Important New Book.

Automatic Telephony

A Comprehensive Treatise on Automatic and Semi-Automatic Systems

By ARTHUR BESSEY SMITH, E.E.

Member A.I.E.E., formerly Professor of Telephone Engineering, Purdue University,

AND

WILSON LEE CAMPBELL, E.E.

Fellow A.I.E.E.

406 pages, 6 x 9, illustrated

17s. net, postpaid

See our Advertisement, January issue, page 1V.

CONTENTS.

CHAPTER

I.—Trunking.

II.—Automatic Electric Company's Switchboard Apparatus.

III.—Subscribers' Station Equipment for Use with Automatic Electric Company's Two-Wire Systems.

IV.—Measured Service Equipment.

V.—Automatic System of the American Automatic Telephone Co.

VI.—Siemens and Halske System.

VII.—The Lorimer System.

VIII.—Automatic Traffic Distributor Equipment.

CHAPTER

IX.—Automatic District Stations.

X.—Clement Automannual System.

XI.—The System of the Western Electric Co.

XII.—Long Distance, Suburban and Rural Line Equipment.

XIII.—Cutovers and Interconnections of Manual and Automatic Offices.

XIV.—Power Plant, Supervisory and Testing Equipment, and Circuits.

XV.—Traffic.

XVI.—Development Studies.

HILL PUBLISHING CO., LTD.,

6 & 8, BOUVERIE STREET, LONDON, E.C.

THE Telephone Rendered Audible under Gunfire

BY THE USE OF

MALLOCK-ARMSTRONG Patent EAR DEFENDERS.

(MR. A. MALLOCK, F.R.S.—SIR W. G. ARMSTRONG, WHITWORTH & Co. Ltd.).

SMALL SOUNDS ARE PRESERVED.

WHEN WEARING THE DEFENDER THERE IS:—

NO TEMPORARY DEAFNESS, NO LOST TIME,
NO MISUNDERSTANDING.

IT IS WORN IN COMFORT UNDER THE RECEIVER OR GAS HELMET.
CONSTRUCTED ON ACOUSTIC PRINCIPLES.



Supplied to every Ship in H.B.M. Navy.



Involves no inconvenience to the wearer.

Remove the Defenders from the Clips and place one in each ear.

In Metal Pocket Case with "Safe-find" Rubber Clips, as illustrated,

4s.

Per Pair.

Post Free,

4s. 2d.

with full particulars.

Many thousands already in use in the firing line.

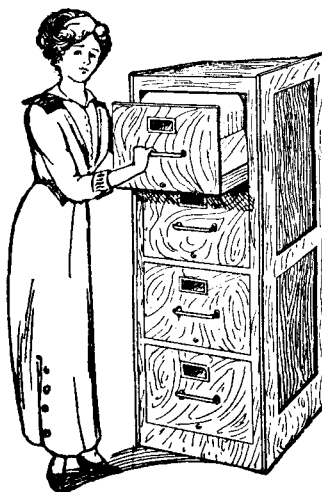
Indestructible.

From Stores, Outfitters and Surgical Instrument Makers, or from:—

MALLOCK-ARMSTRONG EAR DEFENDER CO.,

FACTORY: 5 CARTARET STREET, WESTMINSTER.

Neverstick FILING DEVICES



Meet the needs of all Businesses, Trades and Professions. **None too large and none too small. Our devices are all arranged on the Building-up System, so that you can start with sections for your requirements of to-day and add others as needs arise.**

Has it ever occurred to you the amount of time that is wasted in waiting for letters or documents that have to be found when wanted, instead of being filed so that they can be had instantly?

Our "IDEAL" indexing system overcomes this waste of time.

Let us send you particulars together with our Catalogue containing 60 pages of Ideas, post free.

Write NOW whilst you think of it

SHAW-WALKER, LTD.,

33, ST. BRIDE STREET, LONDON, E.C.

separately for the telegram and for the number of words, with no minimum, save so far as the necessity for saying something in the telegram rendered it impracticable to construct a message with fewer words than three, two of them in the address. So we cannot look for much greater brevity in our telegrams, except perhaps in the case of the thirteen or fourteen-word message. Indeed Mr. Pike Pease had to answer an alarming demand that fifteen words should be allowed for ninepence! Some member of Parliament apparently wished to encourage embellished and elaborate English instead of plain and to-the-point Saxon. He was, I think, an ex-journalist, accustomed to regard quantity with a chuckle. There is only one way to teach conciseness in writing a telegram and that is to penalise prolixity, and in so far as twelve words permit prolixity there is, I fear, no prospect of a penalty. Of course there are exceptions. At Douglas, on the happier Saturdays of the past, I have seen beautifully concise telegrams thus:—"Staying on. Send five shillings." It indicates without rhetoric a retrenched week-end.

This tariff scheme may seem to be complicated. I doubt myself if it is complicated enough for economic needs: I question if there is not scope for a rapid telegram *de luxe* at a penny a word with a minimum of a shilling, at any rate for the longer distances. We have had some experience in handling traffic of this class during the war, in the form of military "priority" messages. But I would prefer to leave this to economic development later. We must remember that already certain ocean cable routes are governed by very complicated tariffs. Take telegrams from England to New York City. There is the ordinary tariff by cable at one shilling, by Marconi at eightpence. Then there is the deferred tariff of fourpence halfpenny by cable and fourpence by Marconi. Then we have the night telegraph letters with a thirteen-word minimum at three shillings with twopence halfpenny per additional word by cable or at half-a-crown with twopence per additional word *via* Marconi, and the week-end letter with a minimum of 25 words for four shillings and sixpence by cable or four shillings by Marconi, and then there is the additional charge for telegraphing these letters in the United Kingdom. Compared with these mosaics of charges the differentiation which I have in mind for the British service is simplicity itself. It does not disturb the halfpenny a word basis as fundamental. It only disturbs the minima and in doing so it keeps a kindly eye on those principles of economics which are now held to govern business procedure as regards supply and demand in the world at large.

There is one curious misconception which sometimes enters. A demarcation is sometimes made between industrial and social. For example, Mr. Charles Devas, in one of the best books yet written on economics, maintains that the telegraph service is only "industrial" if it conducts business traffic as apart from pleasure traffic. From this I venture to differ. It would mean that a telegram ordering a pianola would be an "industrial" telegram, while a telegram ordering a roll of music would be a pleasure telegram. I would argue on the contrary that all wholesome recreation is a part of the industrial whole, and that a telegram which orders an excursion train for brewers in Burton is just as much an industrial telegram as a telegram which orders a barrel of the beer which the brewers produce. It may be difficult to include betting on horse-races if we are to accept this generic doctrine of the industrial value of all telegraph traffic, but we are no nearer a solution if we put telegrams which cater for public amusement in a separate category. Obviously a telegram which states that Nero is fiddling is of less urgency than a telegram which states that Rome is burning, but to argue from this that pleasure telegrams are uneconomical and unindustrial is to forget that in the cosmogony of human endeavour the furtherance of happiness and of recreation is as vital to welfare as the development of the supply of food-stuffs and the organisation of the interchange of material goods. So far from blaming telegraphs for serving the betting industry—if it is an industry—the sounder course would seem to be to divert the attention of betting enthusiasts to other employments. The telegraphs provide a service for industry and enterprise at large, and if one particular community avails itself of that service with especial enterprise it does not throw a moral onus on the telegraphs so long as the enterprise is not illegal. As well might we ask the railway companies not to convey eloping couples, which of course they can do more efficiently than the old stage coaches, or suggest to churchwardens that poor-boxes should no longer be installed since there are so many cases of pilfering. It is one of the ironies of efficient means of communication that while they serve trade and industry they also cater for apparently less desirable aspects of trade and industry, and just as in the establishment of tariffs we have to look at the question from the point of view of demand rather than supply, so we must look at the use to which the service is put from the point of view of the user of the service rather than from the point of view of the service itself. The proposed new tariffs will help the undesirable, or in Mr. Devas' words, the un-industrial sections, but that is only because they help the desirable and industrial sections, and this does not suggest that the telegraphs should cater specially for what may seem to be the less desirable industry.

There is a striking parallel between the industrial and economic conditions which obtain to-day and those of a hundred years ago. Mr. G. H. Ferris shows this parallel in his new book on the *Industrial History of Modern England*. At the beginning of the great war in 1793 the army and navy counted together scarcely a hundred thousand men; before its close England was maintaining nearly a million men under arms. There was appalling taxation. Pitt had five times raised the taxes on spirits and tea, and had added taxes on windows, sugar, salt, bricks, tiles, hats, hair-powder, sea-insurance, horses, dogs, parcels, and newspapers. What Pitt would have done with the Press telegraph tariff I can only leave to fond conjecture. And in the welter which ended with Waterloo, a hundred years ago, the fabric which has come to be modern industrialism began to be built. What will be raised upon the chaos which we see around us to-day? Then there was a

sudden release of capital, a sudden accession of mobile labour, a sudden development of new markets. Invention came as the servant of these great developments. To-day we see evidences of much the same manifestations, but with this difference. In the vast social and economic changes which are pending we have telegraphy and telephony as aids of enormous value. The availability of capital, of labour, of new markets, are all brought more nearly to our hands by the readiness of communication which a hundred years ago was yet to seek. But there is a difference which is of even greater importance. The development during the Victorian epoch was largely one of differentiation, of specialisation. Not only was there the tendency towards the division of labour, so far as individual workers were concerned, but there was the tendency towards the differentiation of functions in industries. The printing trade is an excellent instance, from the days when the editor set his own type and distributed his paper, to the later days when specialised industries manufacture the linotype and the monotype. Now we are reaching a new stage, that of the co-ordination of industries. One of the economic results of the war will be a closer welding of the organisation of industries as a whole. We have seen it in the case of the three thousand munition factories which, wherever they are placed, are worked as a complete whole. The specialisation and differentiation and disintegration of the past century have prepared the way for the organisation and the integration which are to follow. "Integration," says Professor Marshall, "is a growing intimacy and firmness of the connexion between the separate parts of the industrial organism, and it shows itself in such forms as the increase of security, of commercial credit and of the means and habits of communication by sea and road, by railway and telegraph and post and printing press."

This more scientifically economical adaptation of telegraphs will be necessary for the new mobility of industry which is being rapidly developed. Plant which was built for making fish-hooks was soon converted into the manufacture of knitting needles; machinery was changed into the production of dolls' heads instead of pretty drinking mugs; jewelry workers turned to the making of ration tins and weavers, skilled in the art of making Persian carpets in England, turned to the making of warm rugs. All manner of industrial machinery was converted, with amazing speed, into the manufacture of this or that section of what we call munitions. So the specialisation of industrial processes has been modified by what is a new mobility. If this new mobility is to be used to its fullest extent in times of peace for the production of all manner of goods for which, hitherto, with ready acquiescence, we have depended upon other countries, it will need the swift transit of information, the rapid conveyance of demand, the complete organisation of all economic forces which lie behind industrial processes. This new use of the telegraph will meet with prejudices, born of economic inertia, the prejudices which prefer a pork pie if it comes unaccountably from Melton Mowbray or the sauce to accompany that pie if it comes from Worcester (unless it is called 'relish' in which case it must come from Yorkshire). Thus, in the admirable conversion of the sword into the ploughshare, the telegraph and the telephone will bear a considerable part, and the new stage of industrial development to which we are coming needs to be ornamented by a more or less beautiful framework of iron and copper wires.

All this may seem to be coldly philosophical and based on economic considerations which are a little apart from telegraph and telephone procedure. Indeed the economists are a little out of favour even in Germany. I read in the German wireless early in November that 7,000,000 pigs were killed, with disastrous results to the German food position, owing to the ill-thought advice of the political economists. It would have been wiser and obviously safer to have killed the political economists. For all that I am pleading for a wider economic vision of the utility of the telegraph. John Stuart Mill used to maintain that his work at the India Office did not interfere with his pursuit of philosophical enquiries. I would not merely suggest that our day-by-day and bread-and-butter labours should not interfere with our studies of economics. I would go farther and contend that we are not performing the functions of telegraphy with true enlightenment until we have considered what are the values of those functions to the world at large. I ask the John Stuart Mills to bring their philosophical enquiries to the India Office and to draw away the curtain which divides the hours of service from the hours of thought. But economic research takes various forms. It does not halt at mere enquiry. It seeks also the practical application of the results of that enquiry. It may formulate its conception of industry as dependent upon the means of communication, and in the gradual changes which are evident in such economic phenomena as the localisation or the mobilisation of industries and in the further organisation of industries, it may see special opportunities for advancing the usefulness of the telegraph. It may realise that if this or that scheme is adopted the telegraph will wind itself more subtly and more successfully through the warp and woof of industrial and social life. But it must face the question in the shopkeeping spirit. It must use something of the language of Mr. Shaw's barrister—"You, Mr. British Public want to send a telegram: you do not think you do, but you do. You think you want a bottle of hair dye or a more or less luxurious cigar. We are here to tell you that in respect of the telegram, your primary need, we have studied the details of that need and are ready to fit in our scheme with those details." And Mr. British Public succumbs. He did not realise that we had tried to study the full import to the commercial and industrial community of this act of telegraphy. He looked upon telegraphy as the last resort, the refuge of the despairing. "There is no help for it, my dear," he said to his trembling wife, "we must send a telegram." The act of telegraphing was a dying gasp. When perhaps through the unpromising portals of a scented chemist's shop, or an aesthetic stationer's, he finds a Government Department, a living organism, eager and ready to go forth to meet the prodigal and to prescribe for his economic malady, he will soon form a different conception of the value and the utility of telegraphy.

I know no instance in this matter of successful shopkeeping so disconcerting to the enthusiast for public ownership as that of typewriters. Just as the telegraphs began to be worked by the State, in 1870, the three Americans, Sholes, Glidden and Soule invented the typewriter, and Yost was called in as a skilled mechanic to assist. To invent a typewriter was a task comparatively easy compared with the difficulty of persuading the world to buy and to use typewriters. Imagine the conservative Englishman, proud of his clerk's copper-plate, succumbing at length to the American machine. Think of that wonderful canvassing in the 'eighties. "No," said the Englishman, "not me! Writing's good enough for me. And if I buy one of those things it'll always be going out of order, and I'd have to have a girl in my office to work it. That settles it. No women, says I. It isn't seemly." The canvassers pegged away and within ten years they had revolutionised English commerce and revolutionised social customs and done more for the freedom of women than all the propaganda. What happened meantime to telegraphs? Oh, they went patiently on. People used them when they could not help it. And it looks as if the typewriter were about to conquer telegraphy itself and to prove to all men that ready adaptation to economic needs and keen insight into those needs are the only methods by which industrial success can be achieved. It has proved, at any rate, that there is no real demand for the actual handwriting of the original message, and the typing of a telegraph machine is no more lacking in soul than the typing of a private secretary. There is one business firm, I believe, which will not have a telephone. I commend to my telephone brethren the interesting fact that the same firm is enthusiastic in its use of typewriters, though once they objected stoutly to the employment of typewriter girls. What they need now apparently is not a telephone but a private branch exchange.

But to make telegraph traffic is not merely a local economic or industrial enterprise. It has its international aspects. There are signs in plenty that competition between groups of nations will be keener than ever. Added to commercial rivalry there will be the accentuation of international distrust. We began the war with the phrase "Business as usual"; we shall end it, I think, with a clamant cry "Business in any other way but the usual." I am perfectly sure that if, after the war, our industrial organism as a whole is to be put swiftly to the arts of peace, quite apart from the vast development in detail to which I have alluded, it can only be done by the assistance of a swift, energetic and efficient telegraph system. No one who has seen the working of the "urgent" tariff in Germany can deny its usefulness. There are astonishingly few telegrams at the triple rate, but it is evident that these telegrams are of vital importance in the development of national industry. A couple of years ago I had intended to show the value of this service, given as it is at what seems to be an extravagant charge, in the development of German commerce. Some of the data which I gathered included instances of large scale orders and commitments for other countries which would not have been possible without an exceedingly rapid internal telegraph service, a service which was well worth the triple charge per word in the special circumstances. We shall face the re-building of English commerce and industry at, I trust, no distant date, and in placing this outline of a new telegraph tariff before you I would have you believe that its first object is to aid in that upbuilding. It is doubtful if we need the triple tariff. We can give a rapid service at the tariff I have mentioned if the gaps or interstices which such a service involves are filled with remunerative traffic of a less urgent kind.

And there is another feature, of even more importance than economic or industrial development. An old world is passing rapidly from us—passing in a cloud of bitter grief, of misunderstanding and of hatred. Little of what belongs to that world will remain. Our conceptions of mutual service, of duty, of administrative leadership, of high responsibility—all these are changing. The Victorian epoch is almost as far from us in social and economic fact as the Feudal period is in history. It struggled to fit a democratic ideal into a framework of individualism. To-day we have learned not the deficiencies of democracy, as some writers would state, but the necessity for a closer organisation in order to make democracy truly articulate and genuinely effective. Just as the *Pax Romana*, with its magnificent roads in the distant portions of the Empire, was a factor in the rapid spread of Christianity in the earlier centuries, so in the twentieth century the means of communication—the telegraph and telephone—may be an important factor in the spread of the new civilisation. With due humility we may confess that we have passed through a period in which priceless lessons have been taught to us, in which many old prejudices have been shattered to fragments. Just as the industrial and commercial elements in the vast and complex social structure of the immediate future will need to be much more fused and welded and commingled than in the past, so the human elements will need closer welding, closer co-ordination, closer organisation. We need to do all in our power to aid this closer binding, to modify the separations of time and distance and to traverse the gulfs which divide business and industrial enterprises and social grades. Our telegraph service will need to face the possibility of doing something more than transmitting messages at the demand of isolated individuals. It will have to become a public service, including in its mission the dissemination of officially-gathered information as regards market prices, demands for goods, supplies of food-stuffs and raw materials, and other information, too, which will go to the enlightenment of the community in respect of civic and national duty. It will set out to break down the isolation of outlying districts and the separateness of individuals. It will batter at the walls of material separation, it will emphasize the possibility of closer communion between man and man, no longer held apart by space or sundered by time. And in this binding and welding and healing a telegraph service which shall meet the different needs intelligently and enterprisingly

will possibly assume something of leadership in the making of a firmer and worthier social state. In this high endeavour there may be some disappointments, but finally they will not overshadow the glory in which each of us, according to his or her vocation and ministry, will be proud to partake.

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

It was stated in last month's JOURNAL that a cross transfer had been effected between Miss FORGE, of Hop Exchange, and Miss NURSE, of London Wall. Instead of "Hop" should be read "Avenue."

Transfers—

Miss GOODWAY, Assistant Supervisor, Class I, of Hammersmith Exchange, has been transferred to Regent, and was presented with an umbrella by the operators at Hammersmith.

Miss KATHERINE E. WINTERHALDER, Assistant Supervisor, Class II, has been transferred from Hampstead to the Park Exchange.

Miss M. C. STRONG, of the Lee Green Exchange, was presented with a gold pendant on the occasion of her transfer to Woolwich Labour Exchange.

Miss A. J. DUDGEON has been transferred from Reigate to Redhill.

Miss F. E. BENSON, Assistant Supervisor, Class II, was presented with a gold cross on being transferred from Sydenham Exchange to Avenue.

Resignations—

Miss A. E. A. DOE, Assistant Supervisor, Class II, of City Exchange, who has resigned to be married, was presented with a large number of gifts including a silver tea and coffee service.

Miss L. E. MASKELL, of City Exchange, has resigned.

Miss MAY JESSIE REDFORD, of Hampstead Exchange, has resigned in order to take up nursing duties. She was presented with a dressing case by the staff.

Miss IVY M. BAKER, of London Wall Exchange, has resigned in view of her approaching marriage, and was presented with a cut glass salad bowl by the staff and with personal gifts by various colleagues.

Miss E. S. LINGWOOD, of London Wall Exchange, was presented with a trinket set and a sardine dish on her retirement.

Miss W. M. GALLOWAY, of Kensington Exchange, has resigned in view of her coming marriage. She was presented by her colleagues with a standard lamp and other gifts.

Miss ROSE LILY EDWARDS, of Mayfair Exchange, has resigned on account of her approaching marriage, and was the recipient of several useful gifts including a silver tea service.

Miss MAY EVELYN ASH, of the Trunk Exchange, was presented by the staff with cutlery on resigning to be married.

Miss ISABEL A. THOMPSON, of the Trunk Exchange, has resigned.

Miss EVELYN A. HART, of the Trunk Exchange, has resigned.

Miss BAKER, of Sydenham Exchange, has resigned.

Miss E. M. OXLEY, of Paddington Exchange, has resigned on account of her approaching marriage; she was presented with a dinner service and other gifts.

Miss L. E. CROCKETT, of Paddington Exchange, on leaving to be married was presented with a tea service among other gifts.

Miss I. G. BROWNING, of Paddington Exchange, has resigned.

Miss JESSIE COWAN, of the Battersea Exchange, has resigned on account of her approaching marriage. She was presented by her colleagues with many useful gifts including a tea service.

Miss C. MURRAY, of Putney Exchange, has resigned on account of her approaching marriage, and was presented by her colleagues with a cake basket.

Miss E. PARLETT, of Museum Exchange, has resigned on account of her approaching marriage, and was presented with an *epergne*.

PROVINCIAL STAFF.

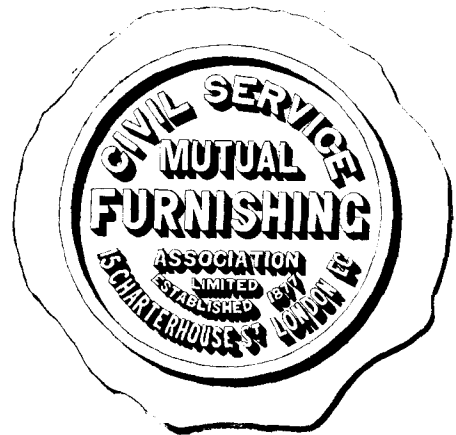
Miss E. B. B. EMMERSON, of the Great Yarmouth Exchange, resigned on March 18 in view of her approaching marriage, and was presented by the staff with a silver teapot, salad bowl and servers.

Miss EVA G. SCORGIE, Female Clerical Assistant at Aberdeen (District Manager's Office), was presented with a set of silver teaspoons on the occasion of her resigning to be married. The presentation was made in name of the staff by Mr. J. T. Whitelaw, District Manager, who referred to Miss Scorgie's qualities in terms of appreciation.

Mr. A. M. DALY, Contract Manager, Middlesbrough, retired on April 30 after nearly fourteen years' service. The staff presented Mr. Daly with a handsome clock and fountain pen as a mark of esteem, the gifts being handed over by Mr. Alan Roberts (District Manager), who congratulated the recipient upon his being able—at the age when departmental regulations compelled him to retire—to take up a position in another branch of commercial life, and wished him every success in his new sphere. Mr. T. Hann (Chief Clerk) and others expressed regret at Mr. Daly's retirement, and conveyed best wishes for good health and prosperity.

Out-of-Income

Civil Servants can obtain every Home Requisite, selected from the combined stocks of the best Firms in London and the Provinces—Firms who sell at Cash Prices only, and most of whom mark all their goods in plain figures—through the



CIVIL SERVICE Share Purchase and Investment Society, Ltd.

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year.	2 Years.	3 Years.	5 Years.	7 Years.	10 Years.
17s. 5d.	9s. 1d.	6s. 3d.	4s. 1d.	3s. 1d.	2s. 5d.

Stocks and Shares bought or sold through the agency of this Society.
Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society exceeds the sum of £600,000.

When your Safety Razor pulls

Don't throw away the old blades; pack them up and send them to us, and we will re-grind and re-set them and return them to you post free, and charge you only **ONE SHILLING** per doz. blades.

EMPIRE RAZORALITIES

(Dept. T.J.)

16 LIVERPOOL STREET ARCADE, LONDON, E.C.

HAVE YOU SEEN THE NEW STYLES?

**SPECIAL
TERMS
to
Telephone
and
Post Office
Staff.**

Crichton's New "Book of Ideas" is now ready—all the latest fashions; send a postcard, and a copy will be sent immediately.

Why don't you open an Account at CRICHTONS'?

You can order your

New Coat and Skirt, Overcoat, Mac, or Raincoat, Blouses, Underwear, Shoes, Trunks, &c., &c.,

on the 'Times' System—quite private and confidential—from **5/- monthly.**

A postcard sent off to-night and full details will reach you by return.



Ladies' Tailors,

CRICHTONS' Ltd. Furriers and Outfitters,
14, CRICHTON HOUSE, DEVONSHIRE SQUARE, LONDON, E.C.
(One minute from Liverpool Street Station).

WANTED.

WOMAN ORGANISER, full time work among Telephonists and other Post Office employees.—Apply, stating terms, qualifications, etc., to GENERAL SECRETARY, Postal Telegraph Clerks' Association, Cathedral House, Paternoster Row, E.C.

THE BRITISH BATTLE FLEET

ITS INCEPTION AND GROWTH THROUGHOUT
THE CENTURIES TO THE PRESENT DAY

By FRED T. JANE,

WITH

Twenty-five Illustrations in Colour from Water Colour Drawings

By W. L. WYLLIE, R.A.,

and numerous Plans, Maps, and Photographs, &c.

PUBLICATION SANCTIONED BY THE ADMIRALTY.

THE ACCOMPLISHED AUTHOR.

It is the work of a man who writes out of the fulness of knowledge that comes from a lifetime study. An author who writes in such a way as to render a subject, bristling with technicalities, as clear as noonday to all.

This book is no mere catalogue of fighting ships, but the only genuine

HISTORY OF THE NAVY.

It treats of types and designers of those types, takes account of every genuine improvement in "effectiveness" from the days of the "Great Harry," commissioned by Henry VII. (the first British ship designed and used exclusively for war), down to the largest and latest of our super-dreadnoughts, "The Queen Elizabeth."

It gives an authentic account of the important new arms

THE SUBMARINE AND THE WATERPLANE.

Mr. Jane graphically describes both the uses and the limitations of these remarkable engines of war.

In short, this is probably the most vital book of the day, for it makes plain to all the great

task with which our men and our Fleet is entrusted.

SPECIAL VALUE TO MUNI- TION WORKERS AND INVENTORS.

New inventions were never in such demand. The Admiralty and the Munition Department have both set up influential Boards of Distinguished Men specially to examine all ideas submitted, *but these ideas must be practical.* Read "The British Battle Fleet" to understand what is wanted by the Navy.

YOUR SONS IN THE NAVY WILL WANT IT.

They will revel in this book if you send it to them, or keep it until they return to civil life. They know it is written by an able man well qualified to write what is undoubtedly the best account of the Navy, its present purpose and past achievements.

"THE REFEREE" says:—

"The author has 'done his bit' to turn our rule-of-thumb nation into a scientific nation by explaining how the wheels go round. . . . In these days such a book as this is priceless."

ILLUSTRATED CONSPECTUS FREE.

Containing Coloured and Black and White Prints of Famous Ships together with full details showing how the work can be purchased by all without strain upon the pocket.

Please send Form or a postcard mentioning *The Post Office Telegraph and Telephone Journal*.

The Library Press, Ltd., 5 & 6 Portugal Street Buildings,
Portugal Street, London, W.C.

Please send me the Illustrated Conspectus of "The British Battle Fleet." This request does not in any way imply that I will purchase the book.

Name

Address.....

Take Hold of Success

More chances are opening up to-day for better-than-average men and women than ever before.

Don't be left behind.

Stop right here and think—don't mar your future by hesitation and timidity—develop your mental efficiency on practical lines—train your mind to achieve—to grip every chance and make the most of it.

Arnold Bennett says mental efficiency is essential to success.

This series of mental efficiency books, edited by a business expert who has helped thousands to success, has just been printed, and to first buyers we offer to send them on approval at our risk. They are marvellous books, unfolding the secrets of business success, rapid progress and certain fortune. Apply quickly for an approval set; only a certain number available.

MENTAL EFFICIENCY SERIES.

Poise: How to Attain It. By D. STARKE.

Force of Character: How to Develop It. By D. STARKE.

Timidity: How to Overcome It. By YORITOMO-TASHI.

Influence: How to Exert it. By YORITOMO-TASHI.

Opportunities: How to Make the Most of Them. By L. CHARLEY.

Common Sense: How to Exercise It. By YORITOMO-TASHI.

Practicality: How to Acquire It. By R. NICOLLE.

Perseverance: How to Develop It. By H. BESSER.

Speech: How to Use It Effectively in All Phases of Daily Life. By XANTHES.

Personality: How to Build It. By H. LAURENT.

Any single volume can be supplied for 3/-;
3/4 by post.

Exclusive Terms to readers of the T. T. J.

By using the Coupon below you can have the entire set to examine for Three clear days, at our risk. You can then either return them or keep the set and send

2/6 only,

the rest being payable by monthly instalments.

YOU RUN NO RISK.

WAR WORDS and their meaning.

Enclose two Penny Stamps for a copy of this valuable book.

Ask for complete catalogue, which will be sent post free.

Coupon for Free Inspection.

To Messrs. FUNK & WAGNALLS,
134, Salisbury Square, London, E.C.

Please send me on approval for three days, carriage paid and entirely at your own risk, a set of the MENTAL EFFICIENCY BOOKS. If approved, I will send 2/6 within 8 days and 2/6 per month thereafter till the full purchase price of 30/- is paid. If I do not want the books after inspection I will return within three days of receipt.

Name.....

T.T.J. Address.....

THE Telegraph and Telephone Journal.

VOL. II.

JULY, 1916.

No. 22.

CONTENTS.

	PAGE		PAGE
TELEPHONE RECORDS	191	EDITORIALS—	
A NEW WAGE SCALE FOR TELEPHONE OPERATORS	193	THE RATIO BETWEEN WORK AND WAGES	198
"LA TECHNIQUE TELEGRAPHIQUE EN FRANCE, DEPUIS L'ORIGINE" ...	193	THE GERMAN POSTAL BUDGET	199
TELEGRAPHS AND TELEPHONES IN BELGIUM UNDER GERMAN ADMINISTRATION. BY W. H. GUNSTON	195	HIC ET UBIQUE	196
TELEGRAPHIC MEMORABILIA	196	GERMAN POSTAL BUDGET FOR 1916	200
CORRESPONDENCE... ..	197	TELEGRAPH AND TELEPHONE WORK IN A PROVINCIAL DEPOT. BY J. M. RUSK	200
UNVEILING OF THE SUPPLEMENTARY ROLL OF HONOUR AT THE CENTRAL TELEGRAPH OFFICE	197	REVIEW	203
		LONDON TELEPHONE SERVICE NOTES	203
		PERSONALIA	204

Subscription: To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies: To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

TELEPHONE RECORDS.

II.—THE FIRST OFFICIAL ACCOUNT OF A TELEPHONE EXCHANGE.

THE JOURNAL for May contained an account of the first references to the telephone in our official papers. The telephone was there regarded as a possible substitute for telegraph instruments on private wires.

Soon afterwards, however, a telephone exchange was opened in London, and in November 1879 this new development was reported on by the Engineer-in-Chief to the Post Office as follows.

A picture of the first switchboard at Coleman Street, to which the description applies, appeared in the JOURNAL for November, page 25.

Mr. Graves' report:—
For the Secretary,

On Friday last, the 7th instant, in company with Mr. Preece, I inspected the working of the Telephone Company (36, Coleman Street, E.C.). We were very courteously received, and everything was fully explained by Mr. J. B. Saunders, the manager.

The mode of working adopted by the Company is briefly as follows:—

Wires are brought to a switch frame from the office of each subscriber to the exchange system, the terminal point of the wire being numbered so that each circuit is recognised by the number corresponding to the name of the subscriber.

As normally arranged the wire entering the Telephone Company's office first passes through an indicating arrangement similar to the indicators used in connexion with telegraph bells in hotels.

When a subscriber desires to speak with another subscriber he first calls the attention of the Telephone Central Office by despatching a current from an ordinary battery at the subscriber's office, through his wire, which traverses the indicating apparatus at the Central Office, and causes a disc to fall suddenly. The fall of this disc shows that the subscriber with whom it is connected wishes to communicate. The Central attendant, seeing this, shifts a movable wire with the effect of causing the subscriber to be no longer in connexion with the indicating disc, but to place him in connexion with a telephone (the battery attached to which

is at the Central Office) fixed upon a desk adjoining the switch frame. By means of this telephone the attendant speaks to the subscriber, ascertains from the latter the name of the firm with which he wishes to be placed in communication, and this being done, the telephone on the desk is in a similar way connected by a movable wire with the line extending to the second subscriber's office. A battery current despatched from a key on the telephone desk (at the Central Office) rings a bell connected with the telephone at the second subscriber's. He acknowledges the "call," speaks through the telephone (worked by another battery at the second subscriber's) to the Central Office, is informed by the latter what other subscriber wishes to converse with him, and then by the movement of a small switch on the telephone desk at the Central Office the two are placed in connexion; the telephone in the Central Office being, at the same time, out of circuit, *i.e.*, being no longer intermediate upon the wires connecting the two subscribers.

At present there is no indication to the Central Office of the time at which the conversation between the two subscribers ends, but arrangements are being made that will provide a signal to indicate this. At present it is necessary to insert the office telephone in circuit and make trial, so to speak, to see if anything is passing.

There are either 52 or 55 subscribers (there is some uncertainty as to the exact number, Mr. Preece having one figure and I the other) at present connected to the switch frame. If everyone is in attendance, *i.e.*, if every subscriber or subscriber's clerk is on the look out for signals coming to him, the operation of connecting together any two out of the 25 subscribers, should not on an average exceed half a minute, *i.e.*, supposing of course that subscriber No. 2 (who may be wanted) is not already conversing with subscriber No. 3. If so, subscriber No. 1 must wait until the other conversation is finished.

It will be seen that the system is partly telegraphic, and partly telephonic. The preliminary signals, and the indications that are necessary prior to conversation commencing are conveyed by means of ordinary batteries and telegraphic apparatus of a well-known pattern. The conversations that are carried on subsequently take place by means of telephones (worked by telegraphic batteries).

A full detail of the mechanical arrangements to effect the foregoing questions, compiled by Mr. Preece, accompanies this. Also a description of the apparatus used.

The only telephones in practical use by the Telephone Company are the ordinary "Bell" telephone, the subject of the original patent; and what is called the "Blake" transmitter. Mr. Saunders does not seem to be very clear whether the Blake transmitter is patented at all in this country. If it is he does not know the name of the patent agent. The instrument was introduced from America some months ago by (probably) Mr. Hubbard, who is a director of the Telephone Company of New York, and who appeared to have the sale of Blake's instrument in his charge.

Various other descriptions of telephones have been sent to the company for trial, but so far none have been adopted nor do I understand that the company have purchased them.

The frame switch to which the wires are brought, and by means of which their connexion is effected (as described above), is prepared for 150 wires, *i.e.*, for 150 subscribers. Mr. Saunders assured me that he had expected an addition of 40 to the actual number within a month.

It should be observed that at present there are only two sets of desk or office telephones required in connexion with the whole number of subscribers' wires. This arises from the fact that although there are over 50 subscribers they use the speaking communication so little, that it is found that two instruments at the office, transferable to any of the wires, are sufficient for the purpose. Of course, if the business became larger and the demand on the wires more incessant, the number of instruments at the Central station must be increased.

We were about 20 minutes in the switchroom at the Exchange Office and as far as I remember, only two instances of communication (independent of those originated for our benefit) took place during the time.

It is noteworthy that the subscribers to the Telephone Company have their offices in nearly all cases to the east of Coleman Street. The communicating wires are usually from 400 yards to 500 yards long; very few indeed exceed half a mile. One to a wharf on the south side of the river below London Bridge, one to Ludgate Hill, and one to Mr. Forbes' office (London, Chatham and Dover Railway) are the only exceptions. There are two other wires going to Cannon Street, but for whatever purpose they are used they bring no revenue to the Telephone Company. There being so little going on and the telephone wires being in immediate proximity (only two telephone wires and those but for a few yards), the effect of induction was not observed, nor can it in any case be very considerable so long as the company are enabled to maintain the separation of wires as at present. It is, however, very evident that this cannot long be the case if the number of wires increase. There are now 49 wires proceeding from Coleman Street in an easterly direction crossing overhead over Moorgate Street.

Mr Saunders told me that owing to the business developing almost entirely among City houses they had found that Coleman Street was on the outside edge, as it were, of their field, and that they were about, at an early date, to remove their premises to Leadenhall Market (when they had arranged with the Corporation for a building on the site soon to be available).

Then they expected their radiating wires would be much shorter, as a rule, unless they obtained customers at a greater distance than at present.

Branch telephonic exchanges are announced as existing in the West End, but I hear they are only a project.

It is proposed to try the experiment of an exchange somewhere near the Houses of Parliament, as it is thought that telephonic communication may be acceptable to the engineers, parliamentary agents, &c., in that neighbourhood.

£20 per annum is charged by the Telephone Company to each subscriber for his instruments and the exchange privilege. I omitted to ask whether this sum included the provision of the wire, but, from various circumstances, I conclude that a certain maximum length is provided for the amount.

I should add that a rough draft of the description of the telephone working (foregoing) was forwarded to Mr. Saunders

on Saturday last that he might certify its accuracy, he returned it with the statement that it is correct.

Nov. 10, 1879.

E. GRAVES.

Mr. Preece's supplementary report begins as follows:—

THE "BELL" TELEPHONE COMPANY'S EXCHANGE SYSTEM.

There are 55 subscribers each of whom has a wire from his office to the central station in Coleman Street. The wire at the subscriber's office is attached to a complete telephonic apparatus consisting of a *bell, switch, key, and telephone*, but at the Central station it is connected to a *switchboard* only. The switchboard is so constructed that any subscriber can be placed in communication with any other subscriber, or with the central station itself. It is constructed in sections for convenience of manipulation, each section has a table apportioned to it at which an attendant sits who watches for the calls, and who has a telephonic apparatus and certain keys at his command to communicate with whomsoever calls. He has an assistant who makes the necessary changes on the board. The photograph (page 25) gives a general *coup d'oeil* of the board and its appurtenances. This particular one at Coleman Street is made in two sections. The line wire, which is brought down by gutta percha wire from the pole on the roof, is fixed (Fig. 1) behind the board to a stiff spring clip (1) resting upon a fixed brass plate (2), and so arranged that by pushing in a wedge plug (p) the spring (1) is electrically disconnected from 2, and the line wire connected with the loose wire and brass pin (P) (Fig. 1).

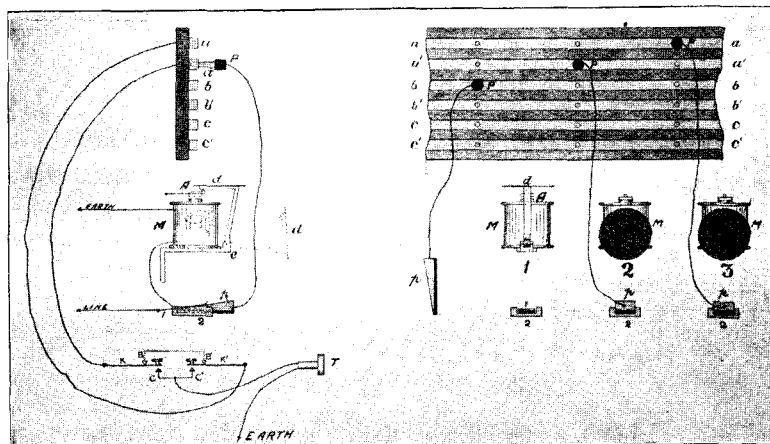


FIG. 1.

The brass plate (2) is in connexion with one end of the electro-magnet (M), the other end of which is in connexion with the earth. The armature (A) of this electro-magnet catches a brass disc (d) fixed at the end of a lever *d, e*, centred at *e*. When the armature is attracted the disc falls into the dotted position, and being painted *red* it attracts attention not only by the noise of its fall but by the brightness of its colour.

The upper portion of the board is fitted with long brass bars arranged in pairs. The bars electrically form part and parcel of the table. *A* and *A¹* are sections of one pair. *A* is in electrical connexion with the key *K* which is upon the table. *A¹* is similarly in connexion with the key *K¹*. *K* and *K¹* in their normal position rest against the bridges *B* and *B¹*, which are in electrical connexion with each other. Each key when it is depressed is brought in contact with brass studs *c* or *c¹*, which are connected through a telephonic apparatus *T* to the earth. These brass bars *a a¹* have several holes bored through them into which the pin *P* can be inserted.

Now supposing that subscriber No. 2 wants to communicate with some other subscriber, he first presses his key to attract attention. This sends a current of electricity which passes through the electro-magnet *M*, attracts the armature, and releases the red disc. The attendant instantly inserts the wedge *p*—or "jack"

as it is called—and inserts the pin at the other end of the loose wire into one of the holes in bar a^1 . The attendant then presses down key K^1 and brings the telephonic apparatus T in communication with the subscriber. The subscriber says "put me through to No. 3," or "put me in communication with Brown and Robinson." The attendant then inserts another "jack" in the clip 3, the pin of which he inserts in a , the other bar. He presses the key K down bringing his telephonic apparatus in connexion with subscriber No. 3, whom he calls by ringing his bell, and tells him "No. 2 or Mr. Smith wants to speak to you." He then releases his key K and the subscribers are through, first telling No. 2 that he was through.

The same process exactly is repeated for any other subscriber using any pair of bars that may be disengaged at the time.

In this way the central station can communicate with any subscriber, or any subscriber can communicate with any other.

There is one defect in the system and that is, the central station cannot tell except *by trial* when the subscribers have ceased to communicate with each other. Several plans have been tried to cure this, and one is now under trial, by which a current sent by either subscriber, or sent automatically by the switch, moves a galvanometer which also acts as a relay and rings a bell. There is no doubt that this defect will be easily remedied.

The Edison Telephone Company of London have only ten wires connected with their central station, and we cannot find out that they have any *bona fide* subscribers.

Their system of working is precisely similar to that described as employed by the Bell Telephone Company. Their apparatus differs a little in detail. For instance, in the call signal the disc that falls does not show a red face but indicates the number of the subscribers in bold figures on a white ground. The switch which is made for 24 subscribers is more compact, and by superposing bars one above another they are able to dispense with the loose wires described above by using pins only. The connexion between two subscribers is made by two of these pins, and are put into communication by means of a bar. The other details are very similar to those previously described. They have remedied the defect spoken of above by simply making each subscriber repeat the call when he has finished as well as when he wishes to commence correspondence. There is no essential difference between the two systems.

A NEW WAGE SCALE FOR TELEPHONE OPERATORS.

(Extract from *Telephony*, of Chicago, May 6, 1916.)

THE Athens County Home Telephone Company, of Athens, Ohio, is making a very interesting experiment in adopting a new wage scale for telephone operators. The cause for its adoption was that the management found it necessary to quicken the answering time and hasten the disconnect. The plan contemplates paying local operators on the basis of the number of completed local calls which each operator makes.

The system has been in effect about six weeks, and the results to date have been very satisfactory. Operators who were handling 600 calls in the morning period of four hours, under the new plan are handling approximately 1,000 calls. The service is now snappy and positive in character, and the subscribers are better pleased. The same traffic load is handled in a superior manner with fewer operators, but at practically the same expense to the company. In the experiment no effort was made to reduce the cost of operating, but to improve its character.

Manager C. L. Jones, who was driven to some expedient to improve his service, states that the conditions under which his company operates in Athens are as follows:—

The switchboard is of the standard common battery multiple type equipped with meters and disconnect pilots. The board is equipped for 800 lines and has five positions on the local end. The local positions are the only ones involved in the new plan, the toll and rural operators operating and being paid as before.

The type of meter used is one that is manufactured by several companies, and is connected with each operator in such a manner that each operator's completed calls are registered.

A very busy operator may be helped by the operator on either side, or, by going into the multiple, an operator can handle any call that she can see is not being cared for on the five positions.

The current which operates the disconnect pilot, pulls up a relay on the meter, and holds it there until the operator takes down the connexion. It then restores to its normal position, ready to record the next disconnection. In this way the operator is inclined to avoid permitting two disconnections to appear at once, which would result in credit for but one call, as the relay would be held in position by the first disconnect, thereby failing to record the second. The impulse that lights the lamp, operates the relay. These relays are wound to operate at the proper voltage which is used to operate the exchange—in this case 22 volts.

The new scheme has brought about a competitive or friendly rivalry among the operators to take care of the incoming calls and disconnects, because each is rewarded on pay day for the number of completed calls during the period.

"Doctor" Jones, in order to determine a basis of pay, took the number of calls in the semi-monthly pay period, and then divided the total pay roll by the total number of calls. In his exchange he found that calls were completed at a cost of approximately 5 cents per 100 calls. He states that this would undoubtedly vary on different switchboards and under different conditions. The average pay for local operators in his exchange is \$22 per month.

Some of the advantages which have already been shown since the introduction of the system are: Increased efficiency of the better operators and a very marked improvement in service in the time of answering and lessening the lines testing busy.

The better and more ambitious operators have increased their pay checks by handling more than the average number of calls, while the inefficient operator has eliminated herself, for the reason that when her check has become small she looks for another job. Four operators have been able to handle the traffic at the busy hour, where formerly five were necessary, with comparatively slow service.

"LA TECHNIQUE TÉLÉGRAPHIQUE EN FRANCE, DEPUIS L'ORIGINE."

So interesting and informative a volume on telegraphy could not be permitted to pass without some more complete reference than that which was possible in the April issue of the JOURNAL.

Apart from the merits of the book, its modest author's connexion with the inauguration of the Baudot system in this country would itself entitle the volume to respectful perusal, while his official career in the service of the Republic lends added weight to the production. Born in 1865, M. Montoriol has spent a lifetime in the French Government service having passed through the Ecole Supérieure des Postes et Télégraphes, and subsequently acting as professor to the technical courses at the C.T.O., Paris. He was also charged with installing and teaching the Baudot system in the following European capitals:—Berne (1896), Vienna (1897), London (1898), Berlin (1900), Petrograd (1905) and Brussels (1909).

Printed evidences of his labours may be found in an excellent work on the Hughes' telegraph system, *Cours sur l'appareil Hughes et les lignes souterraines* and *le guide pratique du Télégraphiste*, besides a number of technical articles which appeared in the official *Annales des Postes, Télégraphes et Téléphones*.

In 1913 he translated Von Stille's work, *Telegraphen und Fernsprechkabelanlagen*, but as he laughingly says, "this is a fish of which it is better not to boast!" However, the French Administration apparently thought otherwise, for in the following year he was made a Chevalier de la Legion d'Honneur.

Without waste of words M. Montoriol dives into his subject, commencing with Claude Chappe, who invented an optical telegraph towards the end of the eighteenth century, curiously enough while in search of a method for utilising electricity to the same end. In a volume of just over 200 pages the author leaves clear-cut impressions of the scientific efforts of his countrymen in the art of telegraphy. This is done with a facile and even adroit brevity which does not result, as some would expect, in a mere catalogue of inventions or a dictionary of names and dates.

Among the interesting points which the writer finds time to bring out is the interesting one that "Automatic perforation was first invented not to give *high* speed, but sufficiently *slow* and regular speed for cable working, and to avoid malformation of signals."

We are further informed how, while Blavier in 1861 was studying the possibilities of duplex, and Wartmann those of multiplex, telegraphy, it became evident that the two systems were possible of combination. The necessity of more accurately copying the line conditions in the artificial line, although recognised by these

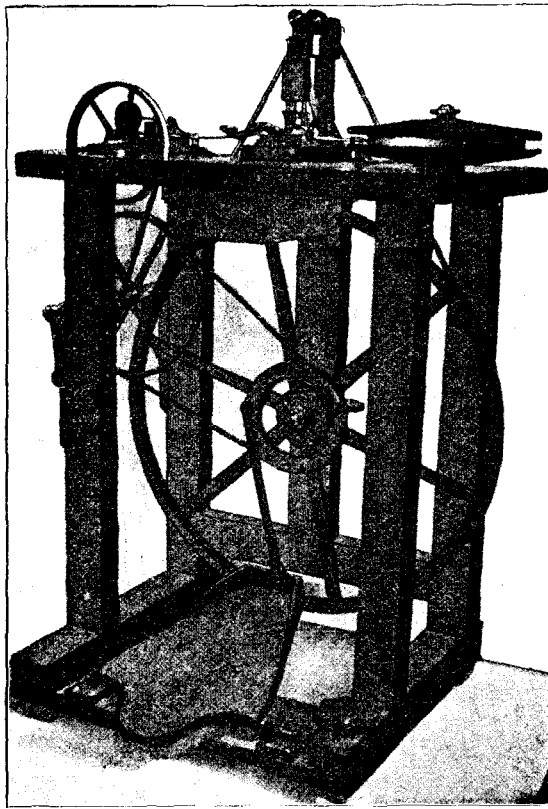


FIG. I.—BAIN'S PERFORATOR, 1846.

two in conjunction with Gounelle had, however, not then been fully realised. Besides which the necessity for duplex had not then arisen in France, and this side of telegraphy appears to have been neglected in favour of the multiplex. Soon after 1870 the French traffic had outgrown the output of its lines, and apparently just after it had been decided to erect additional lengths, Stearns, of the Franklin Telegraph Company, in 1872 invented his well-known duplex system, too late apparently to be of use to the Parisian headquarters.

One particular feature of the book is, that in a work avowedly treating of French inventors and scientists, how generously fair the author appears to be in his references to the contributions of other nations to the common stock of ideas. Thus, when writing of the first automatic perforators, he does not fail to mention the first perforator of Bain in 1846, as well as to reproduce a photograph of the same on the same page as that of the single-key

and also the double-key perforators of M. Digney, invented in 1853 and 1854 respectively.

These, together with the remaining illustrations accompanying this review, are produced with the very kind permission of the French authorities and that of the author.

The single-key perforator of Digney cut a single square hole in the paper band at each sharp touch, but at a *slighter* touch it only released a paper-moving lever, which thus moved the slip one unperforated space forward. If, for example, one wished to punch the words "as it," the key was given one sharp touch,

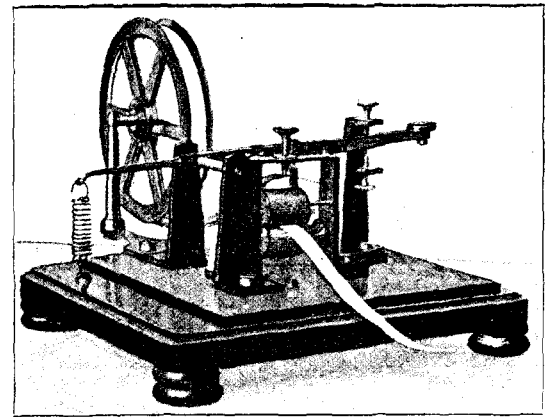


FIG. II.—M. DIGNEY'S SINGLE KEY PERFORATOR, 1853.

followed by one slight one for the space, followed by two consecutive sharp touches, the two latter following immediately, thus cutting a hole twice the size of the first and single touch. This combination gave the conventional "dot" and "bar" necessary for the formation of the letter A. Then followed two spaces for letter separation, and three sharp touches alternated with three light touches for the letter "S," followed by two additional light touches, the latter thus making the necessary word-space, then two alternative sharp pressures for the letter "I," one space and two consecutive punctures for the T, and so on. This was cumbersome, and within twelve months Digney had evolved a

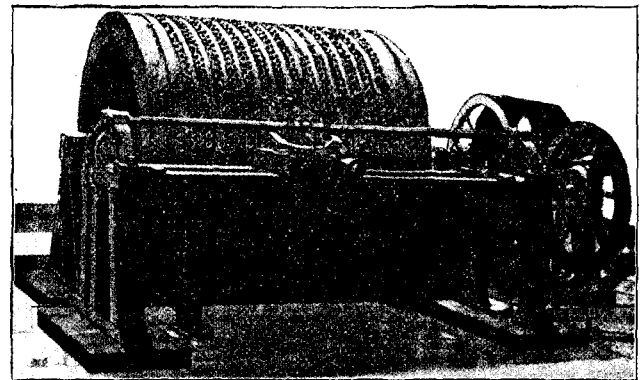
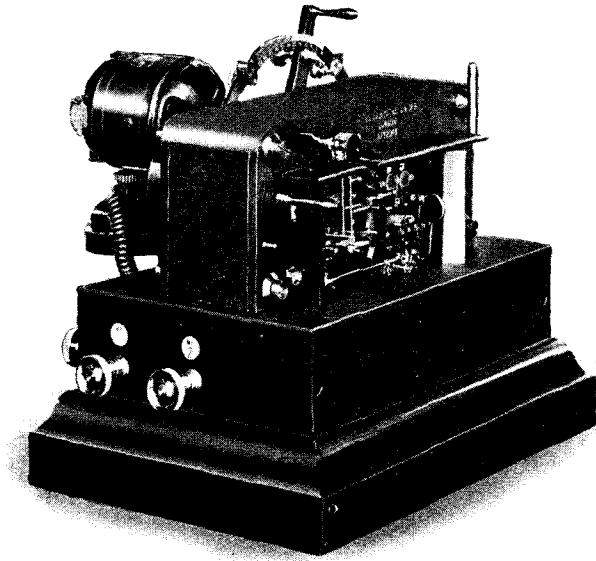


FIG. III.—MARQFOY-GARNIER'S AUTOMATIC PERFORATOR, 1859.

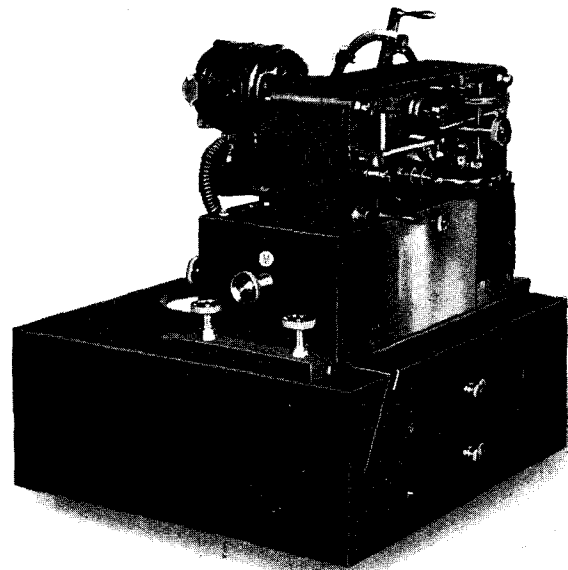
double-key perforator, the second key serving for spacing only. Two years later the same tireless inventor produced his three-key perforator. In this, however, the perforations still continued to be lengthwise of the paper band instead of transversely as in the Wheatstone, which did not appear in the field until nearly seventeen years later. Reference to this advance is also made in these same pages, together with plans and sketches of Wheatstone's automatic transmitter.

In the system of Marqfoy and Garnier (1859) one probably

SIEMENS TELEGRAPH APPARATUS



Wheatstone Transmitter, Direct Motor-Driven.



Wheatstone Receiver, Direct Motor-Driven.

TELEGRAPH APPARATUS

for Single Current or Double Current
Working on the Simplex, Duplex, Quad-
ruplex, Multiplex, or Automatic System.

WHEATSTONE APPARATUS.

Latest Post Office Pattern,
Either Weight or Motor-driven.

Apparatus for

UNIVERSAL BATTERY WORKING.

Charging, Testing, and Distributing Equipments for

SECONDARY CELL WORKING.

BAUDOT APPARATUS.

REPEATERS. Fast Speed or Key Speed.

SIEMENS BROTHERS & CO., LTD., WOOLWICH.

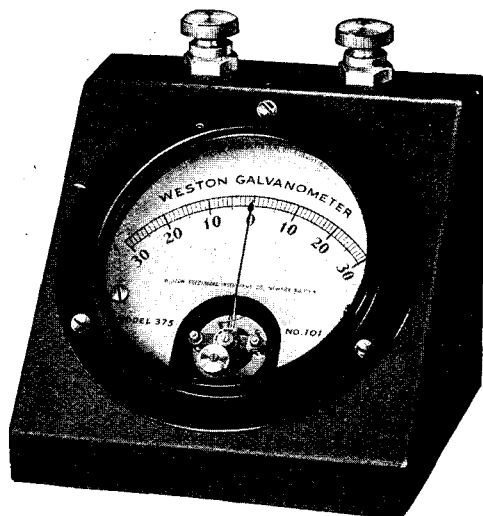
ESTABLISHED 1858.

Telegrams:
"SIEMENS, WOOLWICH."

OVER 4,000 EMPLOYEES.

Telephone:
CITY 6400 (7 lines).

WESTON STUDENTS' GALVANOMETER



MODEL 375.

List Price, 40/-

Write for full particulars to:—

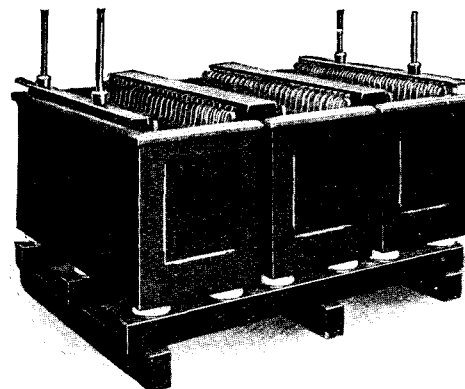
WESTON ELECTRICAL INSTRUMENT CO.

AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

**SPECIAL TYPES of HIGH DISCHARGE CELLS
FOR TELEPHONE EXCHANGES.**

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

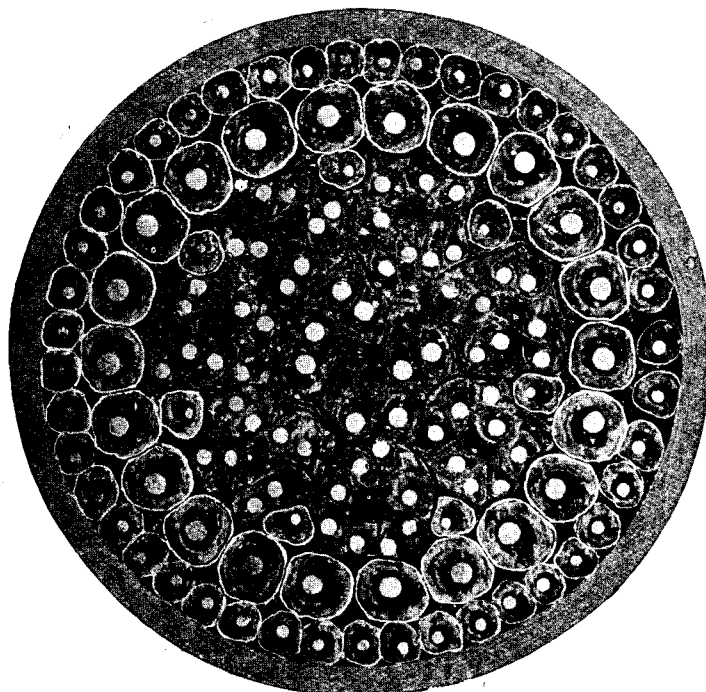
DRY CORE TELEPHONE CABLES.

*Electrical Plant of every description
for Power, Lighting, and Wireless
Installations.*

JOHNSON & PHILLIPS L^{td}

CHARLTON, LONDON, S.E.

ESTABLISHED 1875.



sees the first germs of "mechanical signal selection," afterwards to be evolved into type-printing telegraphy. This apparatus (Fig. III) consists of a brass cylinder fitted with a helical groove. In this groove are placed small copper cubes susceptible of being moved to the left, but whose normal path is to the right and in the direction of the clockwork movement. If, however, and for example, cube numbers one, three and four be pressed to the left, we should have what diagrammatically corresponds with the formation of the letter "A" in the Digney perforated slip, i.e., one cube-cut hole, one space, and a double cube-cut perforation. It is remarkable by the way, how the French have adhered to the square-cut as against the spherically-cut perforation, the former still being that maintained by Carpentier in his type-writer Baudot perforator. When filled with cubes, arranged to represent the Morse letter equivalents of the telegram to be transmitted, the cylinder is fitted to a chariot which rotates against a spring lever arranged in the right-hand path of the helical groove. The lever is connected to line and battery, and actually takes the place of an ordinary Morse key, rising when it meets any of the shifted cubes and thus sending out marking currents of the desired lengths and sequence, and falling back to rest or spacing so long as no obstruction is met.

The principle of this device has been utilised in recent years for "signal storage" mechanisms, as related by Mr. H. H. Harrison before the Institution of Electrical Engineers in November last, and probably gave the hint to the inventor of the Baudot of the *deux voies* selective mechanism.

Although the French did not invent the Hughes' telegraph apparatus, they appear to have been especially attracted to the system in the first case probably because of its solution of the problem of the time lost in printing the letters telegraphed, up to that moment one of the failings of the type-printing mechanism of previous inventions. Hughes, I believe, was the first to introduce the *flying impression*, which entailed practically not even a fractional time loss between the receipt and the printing of the incoming signal.

The typewheel of the original Hughes' instrument as introduced in 1860, we learn from M. Montoriol, only bore letters upon its periphery, figures being transmitted by a conventional signal which indicated that the first ten letters were to be considered at their figure recognised value. Consequently any delivery copy of such a telegram had to be transcribed!

It was therefore due to M. Gustave Paul Froment, of Paris, that the transmission and printing of letters became possible by means of the present alternative arrangement of letters and figures on the typewheel and the now well-known "inversion" mechanism; and this he successfully accomplished only two years after the adoption of the system by the French Government, which system until the progress of the Baudot has remained the mainstay of telegraph work throughout France and many of the surrounding countries.

In rapid review we have before us the pantelegraph of Caselli (1861), the autographic systems of Lenoir (1864), Meyer (1866), Arlincourt (1872) and that of Jordery (1878), the latter not without its resemblance to the present-day telewriter.

The conception of the multiple system of telegraphy, as a means of increasing the output of the lines, appears so far as France is concerned to have been due to Rouvier, who in 1858 by means of two synchronised pendulums, each carrying brushes and each swinging over its respective "arc" distributor, picked up connexion with a series of segments at certain points of time in the synchronic swing, thus sending or receiving the various currents delivered to the segments, the line being permanently connected to the two pendulums.

M. Meyer, *controleur des Lignes Télégraphiques* (1872), by means of a circular distributor arranged for simultaneous transmission on Morse by six channels. This is the first mention of anything approaching the use of a "cadence" being used in telegraphy, a species of metronome being utilised to inform the operator when the moment had arrived for the depression of his particular keys.

J. J. T.

(To be continued.)

TELEGRAPHS AND TELEPHONES IN BELGIUM UNDER GERMAN ADMINISTRATION.

By W. H. GUNSTON.

Blätter für Post und Telegraphie, a semi-official German production, has some interesting information on the position of telegraphs and telephones in Belgium as at the middle of February 1916. The Belgian Telegraph Administration before departing had naturally taken good care to leave the telegraph and telephone system in as useless a condition as possible, and the Germans had no easy task in restoring a limited system of communication for military and hospital needs. Plans and records were either removed or altered so as to give rise to short circuits or false connexions. Many of the cables and wires were damaged either purposely or owing to the exigencies of war, and long sections of the routes were in indescribable confusion. The apparatus was in many cases destroyed altogether or rendered unusable by the removal of parts. The apparatus room of the chief telegraph office in Brussels was so devastated that it was necessary for some time to employ a temporary office with new apparatus. In Antwerp, when the Germans took possession of the head office two days after the fall of the fortress, we learn that they were able to rectify the false connexions at once, and traffic was thenceforth resumed without disturbance. In a comparatively short time the larger offices at Brussels, Antwerp, Liege, Ghent, Charleroi and Verviers were in full working order. The telegraph traffic between Brussels and Germany was said to be very heavy, and the Siemens' rapid telegraph system was brought into use in order to deal with it. Private installations necessary for police, fire, water, tramways, gas, electrical and similar purposes were restored, some 50 private systems being permitted by the general government. Telegraph and telephone lines have been restored up to a length of about 48,000 kilometres of wire, and about 5,700 km. of aerial routes, mostly along the principal railway lines. The telegraph system is divided into 27 districts; 58 telegraph offices are available for public traffic, and 521 exclusively worked by the military provide for military and governmental needs. Two sets of Siemens' rapid telegraph apparatus as well as numerous Hughes' type printers, sounders and Morse instruments are in use.

Private telegrams of a pressing nature with an unlimited number of words are allowed in German, Flemish or French at a charge of 1 fr. for every ten words, excluding the address. Telegraph traffic is permitted between certain places in Belgium and Germany in German or French, but from Germany to Belgium only in German. Information about troops, military or naval movements is forbidden. For this service the charge for an ordinary telegram is 50 c. plus 9 c. for every word, for urgent telegrams 150 c. plus a charge of 27 c. for each word. The private telegraph traffic has developed favourably, amounting within Belgium to a monthly total of over 20,000 telegrams.

The Belgian people are not so fortunate with regard to telephones; we are informed that private telephone traffic is not "yet" permitted. The number of telephones which was probably 50,000 before the war, is now 4,700 of which 1,800 were in Brussels. We may assume that this poor number only serves the host of German officials, military and civil, with which the unhappy country is infested. The telegraph and telephone staff is, of course, entirely German, and consists of about 280 officials, 80 officers of lower rank and 320 telegraphists, besides a number of military.

Our article, "First and Second Class Telegrams," says a Manchester paper, has caused the query, What was the most lengthy message that was ever sent under the now vanished rate of twelve words for sixpence? We cannot say, but should imagine that the following, sent when the sixpenny telegram was first introduced will not easily be surpassed:—"Administrator-General's counter-revolutionary inter-communications uncircumstantiated. Quartermaster-General's characteristically contradistinguished unconstitutionalists' incomprehensibilities."

TELEGRAPHIC MEMORABILIA.

YET a few more lines from our telegraphist friend in the prison camp of Ruheleben! These tell of the prisoners' patriotic efforts on behalf of "England, dear England," for they announce the right royal celebration of the Shakespearian Tercentary, plays, scenery and all. The writer gives a glowing account of the performance of "Twelfth Night" by a band of interned British amateurs, who had also assisted in painting and arranging the stage properties and effects, and who on a succeeding evening were to appear in "Othello." Thus on alien soil most truly do our compatriot exiles, "Keep the home fires burning."

It may have been noted, that according to the reports which appeared in certain newspapers regarding the complete taking over of Salonica by the Allies, "no opposition was offered by any of the various government or corporation officers, docks, custom-house, police, &c.—except at the *Central Telegraph Office*." . . . Thus is the electrical spirit in evidence throughout the world!

At one time all Government telegraphists were looked up to as encyclopaedic in their general knowledge of contemporary events such as are the "Correctors of the Press," and one would be sorry to feel that this standard had in any way been lowered. The regrettable but necessary dilution of labour during the war would, one had hoped, at least have left the average boy or girl fairly conversant with the ordinary military terms common to the conversation of the home, and the street. Hopes of this kind are doomed to disappointment when one reads of the "trench-mother battery," intended, it was subsequently discovered, to stand for trench mortar battery.

In an interview with Marconi, whom he terms "The Wizard of the War," published in the *Daily Chronicle*, Harold Begbie, attributes one or two striking sentences to the great inventor. Pleasantly accused of reducing everything to materialism the Italian said, "I often think that D'Annunzio came pretty near to truth when he suggested that *wireless* is something of a symbol for religion. We send our thoughts through the silence to One who is invisible." I leave that last sentence with our readers as one of the most beautiful descriptions of this the subtlest branch of our always mysterious craft.

In passing, it is curious to note how Marconi has come to be the centre round about which all other wire-less investigators and inventors rotate as round a sun. It is no detraction from the value of the great Italian's labours, however, to remember some of those other names which have rendered no less useful if less conspicuous service to the science of wireless waves. Hertz, Tesla, Clark Maxwell, Oliver Lodge, Branly, Poulsen, Ferrié, Forest, surely deserve some other fate than that of being lost in the ocean even of a great personality.

From a recent work detailing the history of French telegraphic literature one learns that the official *Annales des Postes, Télégraphes et Téléphones*, founded in 1910 by M. Millerand, Minister of Public Works in France, and now published under the direction of a technical committee and under the auspices of l'Ecole Supérieure des Postes et Télégraphes, was actually the outcome of a periodical known as *Les Annales Télégraphiques*. This latter journal was actually founded in 1855 by a committee of French telegraphists, and continued its useful bi-monthly issues uninterruptedly up to the year 1866, to be revived in 1873 only to finally expire in 1899. It was a worthy effort on the part of the staff to give the latest news and information regarding the telegraph profession to its readers; new inventions, theories, and systems each in turn came up for discussion in its pages. So far as one can gather, the venture foundered on the rock of insufficient financial support, but the fact that a staff educative effort in this direction was so persistently made is in itself a tribute to the clan telegraphist.

It is noted that a certain provincial office is apparently not over pleased with Creed working, and wonders "whether it will stay its probationary period." If the system and mechanism be carefully studied—and these are well within the scope of the skilled and practised telegraphist—there should be little difficulty with the adjustments. The Creed, however, is not unlike other

machine printing telegraph systems, it demands a certain accuracy in the formation of the electrical signals received, while at times it appears that too much is expected even from clever combinations of wheels and levers. As a matter of fact with every type of new apparatus it is a case of "save me from my friends," for the over-enthusiastic devotee is apt to ascribe virtues and possibilities which the inventor himself has never claimed. The only safe attitude towards all untried systems is that of level-headed but sympathetic criticism of a type, which, while noting defects, analyses them and having determined whether they be human, electrical or mechanical, searches about to discover if there be a remedy. Had this not been the attitude of certain officers of the Department from time to time it is safe to say that no single modern telegraph apparatus would hold the safe and advancing positions they do to-day. This is perhaps not a very popular view, but of this the writer is confident, more than one inventor has expressed personal obligation to members of the telegraph staff for practical hints and suggestions—here a lever, there a wheel. It should be an exploded theory by this time that it is either the wish of or to the interest of high responsible officials to spend the nation's money upon apparatus which cannot be made to yield profitable results. When all is said on this score it has to be admitted that the present is at best a doubly trying time for the installation of new apparatus—even when it is new only to a particular office. Many of the auxiliaries of good working and the aids to maximum results are scarce, and not least those "spare parts" of the human type so highly necessary for that complete efficiency which indeed is the only real economy.

Pursuing some of the thoughts to which Mr. Lee's paper gave birth, a correspondent wrote asking whether the future possibilities of aeroplane competition had been taken into consideration when weighing up the question of deferred telegrams. One's first impulse was to smile patiently upon the apparent absurdity of the poor letter-writer's query: the next was to query whether, after all, there was not something very practical in the enquiry. Is an aerogram service so very remote from practical Post Office politics? Is the time so very far off when an hourly express service between London and Brighton, let us say, will be considered as part of the daily routine of the Postal Service? Wild as such ideas would have appeared two or three years ago, it is by no means unlikely that the Telegraph Service will have to meet this possible competition in the not very distant future. Such a service could compete hand over hand with a Telegraph Service which even at fourpence for eight words only guaranteed to deliver this evening's telegram some time synchronising with the morning delivery of *to-morrow*!

My correspondent's letter of not more than twenty words has made me feel more uneasy concerning the future of the Telegraph Service than any telephone threats or schemes of competition that have as yet been adumbrated.

Speaking recently to an official of the Accountant-General's Branch, the thought occurred that with all the attempts of inter-departmental education, it would doubtless prove of considerable enlightenment not to say of considerable professional assistance if now and again the dry-as-dust statistician and porer-over of figures could be brought into living contact with some of the apparatus with which his statistics deal. They would surely have a new meaning for him and he would gain a new sense of proportion which even columns, percentages and curves could not convey. There are frequently telegraphic and telephonic factors known only to the practical every-day worker which could they be comprehended would not infrequently very seriously affect the results of days and weeks of patient calculation.

Writing of the A.G.D. reminds me that the speaker referred to in the report of "A Profitable Evening" as speaking from an A.G.D. point of view, was Mr. Cross, whose name unfortunately escaped me, although my memory should have served me better.

While bordering on the personal perhaps my esteemed H. B., of Birmingham, will forgive this my somewhat tardy acknowledgment of his kind and piquant reference to myself in his *Ardentia Verba* of the April issue. I have indeed been wondering why he should ever have thought me capable of adversely criticising the

facile flow of his, to me, always welcome pen. I have indeed earnestly endeavoured to approach the standard he himself set me years ago in polished phrase and paragraph: nevertheless it has taken me just two months to reply to his erudite *verba* and to finish my notes in the same tongue as my former English model. Therefore let me assure my dear Bristowe that if in the days of stormier scenes we were yet both able to preserve an unruffled exterior, certainly in our more sedate years and in these sedate pages it is never likely to be a case of *a verbis ad verbera*!

J. J. T.

CORRESPONDENCE.

BOOKS ON POSTAL ADMINISTRATION.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

WOULD you very kindly extend the hospitality of your columns to the following communication, notwithstanding its subject matter really being beyond the province of your journal?

I have been impressed by the paucity of literature, other than, of course, the official manuals, written in English which deals with postal administration from a practical standpoint; and at the same time by the volume of such literature existing in the French, German and even Italian languages. And it has occurred to me that some of your readers might be able and willing to furnish me with particulars of publications in this connexion which are likely to prove of practical use to one in a Colonial Postal Service. It may very well be that such works as I desiderate, *i.e.*, containing for example practical information as to the working of international money order services; the exchange of international letter and parcel mails; a commentary on the various Rome Conventions; and the science of postal rates generally, &c., even if in existence in English, are not available for general information, but I feel sure that some one will be able to afford some sort of assistance.

I may add, in conclusion, that, with the exception of Mr. Lee's excellent book and two volumes in the Harvard University's Economic Series, I am not acquainted with any practical works dealing with Postal and Telegraph (including Telephone) matters.

QUAERE.

Nairobi, March 16, 1916.

TELEGRAPH TARIFFS.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

I HAVE read Mr. John Lee's paper on "Telegraph Tariffs and Economic Needs," with considerable interest. Apart from the question of the valuable State services performed by the Telegraph Service especially in times of public emergency, it seems to me that a tariff which does not show a profit sufficient to cover the expenditure and the capital charges is essentially a subsidy in kind to the telegraph users of this country. That being so, the question arises whether a subsidised telegraph service can properly be defended on economic grounds. In other words is there a sufficient gain to the community at large in respect of each telegram which is transmitted at less than cost price. It has been said that telegrams may be divided into three main classes, *viz.*, commercial, social and sporting; and, if we assume that every commercial telegram is advantageous to the community—a rather large assumption—we might justify subsidised commercial telegrams, but theoretically we ought not to subsidise social and sporting telegrams. Would it be practicable to differentiate between the different classes with any degree of exactitude? I think not. The telegram charge of $\frac{1}{2}$ d. a word compels brevity. Brevity leads to the use of codes and to the elimination of all words which are not necessary to enable the message to be understood by the recipient. The task of distinguishing between say a *bona fide* Stock Exchange transaction and a "gamble" would tax the ingenuity of a man of the world with a full knowledge of the facts. How could we expect a counter clerk or a young girl in the phonogram room to differentiate between two such messages merely by the aid of the abbreviated text of the messages? Many other similar instances will occur to one on reflection, and we are forced to the conclusion that differentiation for tariff purposes between the different classes of messages is impracticable under working conditions.

Differentiation being impracticable, the question at once arises whether there is any moral or economical grounds for continuing to subsidise all messages, because a certain proportion of them bring advantage to the community. The answer is surely "No." Even among the commercial messages, the business may not be such as needs a State subsidy. It might be, for instance, one of those food or coal businesses which are said to be paying huge dividends owing to the artificial conditions created by the war, or it may even be that the message is directly antagonistic to the State, as for instance if it related to a "corner" in products required for State purposes. In all the circumstances it seems to me that the State subsidy to telegraphs ought to be abolished, even in the case of newspapers whose use of the telegraphs enables them to pay dividends to their shareholders, and that any subsidy which the Government considers necessary to specific commercial undertakings should be applied like income tax at the source either in the form of a payment in cash or its equivalent.

M. F. W.

UNVEILING OF THE SUPPLEMENTARY ROLL OF HONOUR AT THE CENTRAL TELEGRAPH OFFICE.

THE continued withdrawal of men for military service has rendered necessary an additional Roll of Honour. The first (an account of the unveiling of which appeared in the issue of March 1915) has long since been filled, and the ladies of the office desirous of showing their appreciation for those who have gone since its completion have generously raised the necessary funds to provide a second.

Colonel Ogilvie, C.B., Second Secretary, again kindly consented to perform the unveiling ceremony and, in introducing him, the Controller took the opportunity of furnishing a few particulars regarding those connected with the office who had responded to their country's call. He explained that the first Roll contained 446 names and that on the new one there were already 548, making a total of 994. Space was left on the latter for 195 additional names, and as the Secretary had already been informed that it would be possible to spare from 200 to 250 more men, it was probable that it would be completed in the not distant future.

The Controller announced with regret that nine members of the staff had been killed in action or had died from wounds. Seventeen had resumed duty in the C.T.O. either wounded, medically unfit or time expired, and two were prisoners of war in Germany. He stated also that 29 had received commissions.

Colonel OGILVIE, who was cordially received, said that it gave him very great pleasure to assist in this interesting ceremony. He was much surprised when he was reminded that it was fourteen months since the first Roll of Honour was unveiled. It almost seemed impossible at that time that we could live through another year of the war. After what we had gone through during that long period we did not seem very much the worse, at any rate as far as outward appearances were concerned. The C.T.O. record was a splendid one. The first Roll of Honour contained 446 names, a large number of officers to be spared from one department. It seemed then that a total of 500, or possibly 600 might be reached before the demand would cease, but he did not think anyone anticipated that a higher number would be attained. Arrangements had, however, been adopted to meet the requirements and everyone concerned had risen to the occasion. A total of nearly 1,000 men had gone from the C.T.O. and some 200 to 250 could still be spared to give their services. He was not sure that even this new Roll of Honour would be sufficient to take the whole list, but the war might be over before they would be called upon to serve.

Colonel Ogilvie then unveiled the Roll of Honour after which, on behalf of the Signal Service, he thanked the ladies of the C.T.O. for their kindness in presenting such a memorial of the struggle in which we were engaged. (Applause.)

Miss BRIAULT (Chief Supervisor) expressed the pleasure the supervisors and staff experienced in presenting the Supplementary Roll of Honour, and said that they were glad to be able to show their keen appreciation of the C.T.O. men in this manner. She hoped that they would soon return and that then they might have the pleasure of welcoming them in the presence of Colonel Ogilvie and the Controller.

Mr. H. PARKER, representing the male staff present and more especially those away, thanked the ladies for their kindly thought which had found such beautiful expression. He had hoped there would not have been any occasion for a second roll. Considering the number of men who had given their services, he regarded the casualties as being remarkably few. Perhaps that had been due to the splendid arrangements, sanitary and medical, made by the War Office. With the possible exception of Gallipoli the medical services rendered had kept disease almost altogether away.

A hearty vote of thanks to Colonel Ogilvie was then proposed by the Deputy-Controller (Mr. V. M. Dunford) and seconded by the Assistant Controller, Cable Room (Mr. A. Tapley), and after being carried with much applause the proceedings terminated with the singing of the National Anthem.

The new Roll of Honour is, like the first, the work of Mr. E. F. Poole, and does great credit to his artistic ability. The arrangements for the unveiling ceremony were again ably carried out by Mr. A. W. Edwards, Assistant Controller.

RAILROADS TO HAVE GIRL OPERATORS.

Another man is about to lose his job to a woman.

This time it is the railroad telegraph operator, according to M. H. Clapp, superintendent of telegraphs of the Northern Pacific Railroad in St. Paul, who addressed a committee of the Association of Railroad Telegraph Superintendents at the Hotel La Salle, Chicago.

"The 'hello girl' is slowly but surely superseding the 'brass pounder,'" said Mr. Clapp. "The telephone is replacing the telegraph in dispatching of trains and other railroad work. It is an excellent check on orders."

The foregoing paragraph is reprinted from the May number of *Telephone Engineer*, of Chicago. We, in this country, are familiar with the term "tub thumping" as applied to the outpouring of spoken words, but the term "brass pounding" for the outpouring of telegraphic words is new to us.

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising	{	Mr. JOHN LEE.
Committee - -		Mr. J. W. WISSENDEN.
Managing Editor -		Mr. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

Vol. II.]

JULY, 1916.

[No. 22.]

THE RATIO BETWEEN WORK AND WAGES.

IN another column appears an article from *Telephony*, of Chicago, about an interesting experiment at Athens, Ohio, in the payment of telephone operators by results. This method of payment is claimed to be advantageous both to the telephone company and to the operating staff, and there are suggestions that a more extended trial of the system will be undertaken elsewhere in the United States. The question whether payment by results is or is not the soundest method of calculating wages where a satisfactory unit is possible has been discussed at all times and in all trades. In this country the Government grants for education were at one time based upon this system, and, so far as we are aware, the results still govern the amounts paid. But the system under the name of "piece-work" has often been employed by unscrupulous employers for the exploitation of unorganised labour. We have all heard of the "sweating" evil, which has been a historic social problem from the days of Hood's "Song of the Shirt" to recent legislation.

Labour, and by that term we mean all types of manual and manipulative work, skilled and unskilled, is however now so well organised that oppressive wage-making by employers is practically out of the question; but as a bye-product of labour organisation we may and do encounter another evil which, though less objectionable from a humanitarian point of view, must have a serious effect on the commercial wealth of this country. The tendency to equalise the man-hour output on the basis of the production of the average worker has received a good deal of attention, both on the part of scientific management theorists and on the part of critics (not very sympathetic) of trade unions. The system has come about from an emphasis upon corporate life as compared with competitive

life, and the moral value of that emphasis is beyond question. Mr. Haselden has shown us in a humorous picture that to sheep all men are cast in precisely the same mould; but, judged by human and not sheepish minds, men and women differ individually not only in features but more especially in their aptitude for work. The want of energy for work may be due to uncongenial employment, or to physical or temperamental causes, or it may be due to sheer downright laziness; but, whatever the cause, it is open to doubt whether any system is just under which the good and the bad worker receive equal pay. If we take the simplest form of a community where each person is a master-man and sells his own produce, then the energetic man who makes, shall we say, most penny buns will secure most pennies. If, however, the man sells his labour, and not labour plus material, and another person provides the material, the more raw material that that labour can turn into a marketable commodity in a given time, the more valuable it is to the employer and the more pay ought to be received by the employed.

If that be granted, then the whole question turns on the measure to be employed to gauge labour of a uniform kind. There are of course many difficulties in settling the unit. One bunmaker might turn out a less saleable article. Like King Alfred he may burn the buns or they may be insufficiently indigestible to satisfy the cravings of the consumers. In Telephony we can of course adopt the completed call as a unit; but then we are faced with the fact that work at an answering position differs from work at a junction position or at a record position, and that the type of equipment and of traffic varies at different exchanges. These difficulties are perhaps not insuperable and, *prima facie*, if proper allowance be made for these factors, there seems no obvious reason why a system of payment by results should not be fair and reasonable. The general tendency of trade is apparently again setting in a direction which will take cognizance of individual merit, and will therefore include some phase of "piece-work," and in many quarters it is held that if this country is to continue to maintain its present position among the trading communities of the world, some such system of encouraging the industrious workman and industry during working hours must be adopted. It needs little reflection to realise that it is the article which is sold and that the manufacturer's costs must be analysed so as to show the cost per article. The necessity for such analysis is itself one of the strongest arguments in favour of a wages bill in direct proportion to quantity. At any rate, whether in the form of piece-payment or in some other form of sharing in the results of enterprise and energy, some change is in the air; it may be that it will take the form of graded outputs in the valuation of which the workers themselves will share. That might prevent the dangers of tyranny and of driving.

For herein lies the one strong objection to the system—namely, that it leads to "speeding up" which is detrimental to the nervous systems of the workers. Recent critics of so-called scientific management have brought some stubborn facts to prove that this has invariably been the result of the new method. Our forefathers had two old sayings—that "work never kills" and "better wear out than rust out." In our

atrabiliar moods we fancy that this generation is inclined to sneer at the virile energy which gave birth to those sayings; but perhaps the real reason is that the progress of civilisation has made our leisure more attractive. Englishmen and women are said by at least one of the present belligerents to put sport before duty. Be that as it may, the chief safeguard against overspeeding would apparently be some method of graded remuneration which would include a consideration both of quantity and of quality. Apart however from the question of "piece-work" itself, there is little doubt that Government service has a weak spot in that individual initiative and zeal are not sufficiently encouraged. Whether the remedy lies in the direction indicated in the article which we have quoted, or in some means whereby scale-wage could be supplemented by payment on results, is a question which will require careful discussion. It is quite conceivable that some more elastic recognition of merit, based upon considerations with which the workers themselves are in accord, would open up the way to fusing the advantages of the Government scale-wage system with those of private reward.

THE GERMAN POSTAL BUDGET.

WE publish in this issue some details of the German Postal Budget for 1916, taken from *Blätter für Post und Telegraphie*, the organ of the higher postal officials. We hope to include next month a summary of the contents of the last volume of this journal which contains much interesting matter regarding the German official's outlook on the war. This budget is practically a replica of that for 1915, which in its turn was a replica of the previous one. The working costs have decreased from 96,000,000 to 87,000,000 marks, chiefly in the telegraph expenses (9½ millions decrease), for the postal expenses have slightly increased. "Naturally" says the editorial comment on the estimated receipts and expenditure, "the figures have only an accounting value and must deviate from the actual state of affairs." The most interesting item in the budget is the capital expenditure for extraordinary telephone purposes which has decreased from 39 million marks in 1914, and 18 millions last year to *nil*, whilst the expenditure on large underground telephone works has decreased from 5 to 2 millions. This is one more unfortunate symptom of the effect of war on telephone development, for, despite the fairly large capital expenditure projected in France to which we referred briefly in our last issue, the stagnation of that development in Europe which we forecasted in our first number has long since arrived and seems likely to continue. The number of telephones in Belgium, for instance, under German administration is only 4,750. Before the war there were 46,000 telephones in that country. In Switzerland we observe from the annual report which we have lately received, that the total number of stations has decreased from 99,860 to 97,847. It is unlikely that in the countries of any of the Great Powers the telephone system is showing any progress, except of the most negligible sort, if indeed, it is not in actual retrogression; but this is necessarily a matter of mere conjecture, for except in the case of Great Britain, where a small annual increased development is shown, no figures are available.

We cannot refrain from quoting the editorial comment of the *Blätter* on the budget. It is at once typical and instructive. The opening sentences translated as literally as possible are as follows:—

"The second war budget! Who had not in the stillness of his chamber wished and hoped when in the previous March the first one was laid before the Reichstag that it might be the last.

Our foes have not willed it so! New, unheard-of sacrifices of blood and goods has the Moloch of war devoured. But all the shameful plans of our adversaries have hitherto rebounded from the iron breastplates of our shimmering defence and from the granite of our people's will to hold out to the last breath. Tooth-gnashing must the rulers of our foes live as the wall of iron and fire which the living strength of our people has erected unshakably resists the boasting of the hireling-folk of almost the entire world, as their deceitful striving to bring us on our knees by hunger shatters against German amenability to order and German inventiveness, as their low-minded hope of destroying us with silver bullets flutters like a dream-picture into nothing."

There is much more about soldier-spirits, battle-swords, and blood-mercenaries, but this sample will suffice. Criticism of the war is not within the province of this JOURNAL, but we think we could point to the Moloch which our contemporary chides. The editorial concludes with a note of congratulation that foreign words have, where possible, been avoided in the budget. *Redaktion*, *Sachregister*, *Remunierung* become *Schriftleitung*, *Inhaltsverzeichnis*, and *ausserordentliche Vergütung*. The reader will note the gain in brevity. Unfortunately *function* and *fonds* are still retained, and, worst of all, the budget itself is called an *Etat*. It is hoped that in 1917 this also will be swept away by the German besom and become *Haushalt*.

HIC ET UBIQUE.

MR. CHAS. LANCASTER, of Liverpool, who takes great interest in all telephone questions, has an interesting article in *The Times* "Trade Supplement" for June on "Banking Reform." Whilst he is of opinion that the British banking system is the best that ever existed compatible with sound banking, he admits that it is not perfect, and advocates the formation of credit banks which would not compete with existing banks but work in co-operation with them. The Government would be expected to support them, but not to control them. "Great Britain," he concludes, "will have an opportunity with the advent of peace to recover the ground she has lost to Germany in developing foreign trade, but a radical change in banking methods designed for this purpose will have to come about."

WE had occasion to criticise Mr. Casson's statistics a few months ago. That scrupulous precisian and hustler is now saying that "the Government is rapidly destroying the whole system of telephony which the National Telephone Company built up. It is said that there are 10,000 fewer telephones in London than there were two years ago." Apart from the fact that there are actually more telephones now in London than there were two years ago, and that Mr. Casson's figures are entirely fictitious, one would think that his argument would have little point in the extraordinary conditions under which all European business is at present labouring. At such a time even with the assistance of imaginary figures it is difficult to see how a small decrease in the number of telephones could be accepted as a convincing proof that the telephone system of any particular city was being destroyed by Government monopoly.

The Nation, a New York weekly review from which we have often quoted, has the following significant remarks on "Preparedness" in its issue of June 17:—

"Of the wider economic significance of 'preparedness' in such a country as America, where all the fundamental industries of transport and communications in which State control is essential to military economy, remain in private hands, very little is heard at present. But a real campaign upon preparedness must bring

out into the open the questions of national control of railways, telegraph, express companies and steel corporations."

With reference to our quotation from the *Daily Chronicle* last month, a "Dublin Telegraphist" writes:

"I see in the recent issue of your JOURNAL that the lady who performed such an able service for the wounded soldier during the Sinn Fein rebellion is referred to as a telephonist. The lady is not a telephonist but an assistant supervisor in the Telegraph Department."

GERMAN POSTAL BUDGET FOR 1916.

RECEIPTS.				1916.	1915.
				Marks.	Marks.
Ordinary Budget	...	...	...	881,288,500 (£44,064,425)	881,569,500 (£44,078,475)
EXPENDITURE.					
<i>A.—Ordinary Budget.</i>					
Salaries, &c., Headquarters	...	...	...	4,176,790	4,177,320
Salaries of oberpostdirektors, overseers, inspectors, and officials generally in Germany and Colonies	...	...	...	330,634,523	330,777,323
Dwelling allowances	...	...	...	64,982,883	64,996,000
Other personal expenses for assistance, pensions, &c.	...	...	...	173,831,997	171,325,697
Working costs (maintenance of travelling post offices and apparatus, payment to railway administration, despatch of posts, maintenance of telegraphs, &c.)	...	...	...	87,273,970	96,547,800
Sundry expenses, travelling, rents, office expenses	...	...	...	40,991,900	41,991,900
Building costs	...	...	...	3,760,000	3,570,000
Other expenses (payments to foreign railway, telegraph and shipping authorities)	...	...	...	37,546,608	37,546,608
	...	...	...	743,198,671 (£37,159,933)	749,932,648 (£37,496,632)
Receipts	...	...	...	881,288,500	881,569,500
Balance	...	...	...	138,089,829	131,636,852
Less capital expenditure (see (b) below)	...	...	...	25,413,547	34,084,906
Surplus	...	...	...	112,676,282 (£5,633,814)	97,551,946 (£4,877,597)
<i>B.—Extraordinary Budget.</i>					
Telephone purposes	...	...	...	—	18,000,000 (£900,000)
<i>(b) Capital expenditure:</i>					
Extensions (new land and buildings, &c.)	...	...	...	25,413,547 (£1,270,677)	34,084,906 (£1,704,245)
Included in this amount are the following telegraph and telephone charges:					
Repayment of and interest on capital	...	...	...	15,208,080	14,719,880
Large underground telephone works	...	...	...	2,000,000	5,000,000

(The mark has been taken at the old approximate equivalent of twenty to the pound sterling.)

TELEGRAPH AND TELEPHONE WORK IN A PROVINCIAL DEPOT.*

By J. M. RUSK (*Officer-in-Charge, Edinburgh Depot, Post Office Stores Department*).

OUR subject, the Telegraph and Telephone Work in a Provincial Depot, can perhaps be introduced by indicating the place of a depot in the organisation of the Post Office Stores Department, and by reminding you of some of the main principles governing stores operations.

The establishment of the Stores Department comprises, besides depots, a Contracts section which arranges for the purchase of stores; an Accounts section responsible for the payment of stores accounts and the accounting procedure of the Department; a Factories section, with factories at Holloway and Birmingham, repairing and to a limited extent manufacturing stores; a Stamps section at Somerset House, which stocks and issues stamps, postal orders and licences; and a General Correspondence section dealing with staff matters, stock provision and work not assigned to other sections.

The depots, situated in London, Birmingham, Dublin and Edinburgh, are responsible for the storage and distribution of postal and engineering stores. In London there is a depot for postal stores at Studd Street, Islington, and a group of depots for engineering stores, under one control, at Mount Pleasant. The Birmingham depot deals almost wholly with engineering stores. The Dublin and Edinburgh depots issue postal as well as engineering stores and at each a stamps section and a mechanics' shop for instrument repairs are to be established.

With regard to the two classes of stores referred to, termed postal and engineering respectively, postal stores include all the articles in general use throughout the Post Office service—in Headquarters Departments, District Managers' and Engineers' Offices, Telephone Exchanges and Post Offices. There are over 8,000 postal items, the chief being printed forms and books, stationery, uniform clothing, string and sealing material, mail bags, weighing appliances, date stamps, cycles and household stores. Postal stores fall into two classes, viz., stores peculiar to the Post Office, such as uniform clothing, date stamps, mail bags, &c., which are purchased from contractors out of the Post Office Votes; and stores used generally throughout the Government service, like stationery and household stores, which are obtained from the Stationery Office or the Office of Works.

Engineering stores, of which there are over 14,000 standard rate-book items, and about 20,000 non-rate-book items, mostly "special" or obsolescent, comprise all the articles used by the Engineering Department in the erection and maintenance of the telegraph and telephone systems, and in the heating and lighting of buildings. Their variety, ranging from a creosoted pole to an instrument screw, is indicated by the following sections into which the stocks of engineering stores are divided:—Poles and pole fittings; overhead line stores such as arms, insulators and stay-rods; bronze, copper and iron wire; cables for aerial, submarine, underground and indoor lines; wiring, cabling and underground material, such as pipes, bends and joint boxes; tools of all descriptions including handtools and ladders; oils and paints; batteries and battery stores; electric light stores; engine, heating and boiler appliances; and all the miscellaneous items required by engineers, mechanics and factory hands. In addition to these, the instruments, bewildering in their variety, are divided into the respective sections—telegraph, telephone, testing and protective, pneumatic, fire alarm and wireless, each with their numerous parts required for local replacements and repairs. Stores peculiar to the Cable Ships are also stocked, as well as quantities of scrap material awaiting disposal by sale. Engineering stores are all purchased out of Post Office Funds and charged to the appropriate Votes or to Telephone Capital Account through the Superintending Engineers' Cost Accounts.

A depot therefore draws its supplies of postal stores from the Stationery Office, Office of Works, or from contractors, whilst its supplies of engineering stores are obtained from contractors or from the factories, but the smaller depots—Dublin and Edinburgh—replenish their stocks of certain items from London or Birmingham. For obvious reasons, each depot does not hold a stock of every item. Certain classes of stores are concentrated at given depots, and the smaller depots only maintain stocks if the demand justifies the expense of storage, recording and accounting.

All stores, however, do not pass through a depot and, as was shown to the advantage of the Post Office in the Telephone Arbitration case, the Post Office Stores Department arranges wherever it is judicious, for supplies to be delivered direct from the contractors' works. Thus, if a postmaster or district manager requisitions quarterly large supplies of a bulky or weighty item, or if an engineer is erecting a circuit requiring numerous poles, pipes,



MR. J. M. RUSK.

* Paper read before the London Telephone and Telegraph Society on March 27.

or large quantities of cable or wire, the suppliers are instructed to send such material to its destination. By this arrangement, very considerable savings in storage space, handling and accounting are effected; but these direct deliveries are a fruitful source of anxiety to depot officers as will be evident when we come to consider the difficulties of transportation. Suffice it here to say that a railway company can mislay a train-load of poles even on a very short journey.

As previously stated, the main functions of a depot are the economical storage and distribution of supplies. The limitations of storage space, the liability to obsolescence and deterioration as well as financial considerations require that in a depot excess stocks should not be maintained; whereas the efficiency of the service demands that stocks should seldom become exhausted. Moreover, stores must be so stocked that they suffer neither damage nor deterioration, for a faulty instrument may at a critical moment interrupt a circuit, or a defective ladder or rope may cause a serious accident. Further, to ensure effective distribution, stores must be packed for safe, as well as economical, transit and for convenient handling if destined for a remote district. Delay in their despatch or an error in transmission may lead to awkward consequences, if, for example, a postmaster has inadvertently allowed his stock of an essential item to run out, or if an engineer is kept waiting, perhaps with a gang of men, to erect an important circuit. Then, the receipts and issues of certain items must be correctly and promptly posted to the depot ledgers or otherwise accounted for. These are a few of the duties and difficulties confronting the Stores Department and necessitating the system of stores records and depot procedure to be described in this paper.

Having indicated the place of a depot in the organisation of the Stores Department, and outlined the main principles which govern stores methods, let me now turn to the particular section of the Department's operations which we are to consider, viz., the organisation and methods of a Provincial depot, so far as they interest the Departments represented in this Society; and we shall take the Edinburgh depot as an example, because its procedure is somewhat simpler than that of a larger depot and its operations cover both postal and engineering stores.

A visitor to a stores depot is generally impressed by the extensiveness of the premises, the first essential of efficient storekeeping being adequate space. Although the depot at Edinburgh is the smallest in the Stores Department, it covers an area of over 90,000 square feet and comprises a new three-storey building measuring 90 feet by 40 feet, a main store 270 feet long and 100 feet broad, and a yard an acre in extent. The ground floor of the new building is to be fitted as a strong room for the storage of stamps; the first floor is reserved for the clerical staff; and the top floor will be equipped as a mechanics' shop with accommodation for 25 workers. Connected with this building by a covered yard is the main store, one-half of which is occupied by postal stores and the remainder by engineering stores. This latter building contains a storemen's retiring room, a room for Money Orders, and a room fitted with a hot water installation for cleaning insulators. There are also sheds for storing straw and certain cables under cover, and a paint store. A covered loading bank extends along the entire length of the store, which is separated from the yard by a wide roadway.

In the yard the visitor will see all the familiar items of Post Office material which may be stored in the open, such as drums of cable, wooden arms and pole fittings, pipes, bends and joint boxes, stoneware ducts, test boxes, letter boxes and stacks of packing cases and casks, with quantities of scrap material. Certain items are kept under tarpaulins and stacked upon sleepers. The military training of our store porters, who are mostly ex-Army or ex-Navy men, is displayed in the alignment of the cable drums and stacks of material, which an engineer would observe are arranged in strict rate-book order. Most of the descriptions of the items are stencilled on white notice boards, which present a somewhat graveyard appearance and led one humourist to suggest that they should read "Here lie Arms No. —."

The bulk of the stores must, however, be kept under cover in the main store. This building, admirably suited for storage purposes, is racked from side to side and round the walls, and wide gangways run from end to end. The racks standing back to back in parallel rows are each suitably labelled and the pigeon holes or bins vary in size according to the nature of the stocks. To each bin or pigeon hole, however small, is affixed a stock card giving the schedule number and description of the stores and, where necessary, special directions to the storemen with regard to particular items.

The manipulative staff for such a depot is thus organised: In charge is a first class storeman, and each section is supervised by a second class storeman, e.g., at Edinburgh one takes the postal work, another the issues of engineering stores and a third the recoveries of engineering stores and transport. The duties of the second class storeman are divided into sub-sections, each under a third class storeman who acts as stock officer and checking officer. These grades are "established," and the remainder of the stores staff consists of "unestablished" store porters. The better paid store porters perform such work as issuing stores and are referred to later as issuing officers; and the others do the simpler labouring work of packing, cleaning and so on.

Let us now turn to the Postal section and examine the stocks more closely. Starting with the printed matter duty we find several racks allotted to each series of forms, and labelled correspondingly. For example, the forms in the postmaster's series are numbered 1 to 500; each has a separate space and all are stocked in strict numerical sequence. The first question the visitor asks is, why a portion of each stock is enclosed in red tape. The tape separates what is termed the minimum stock, generally three months' consumption, from the main stock; thus, if 10,000 represent a year's consumption of a given form, 2,500 are taped off and when the tape is cut, the stock officer knows that steps must be taken to replenish supplies. This, remarked a recent visitor, was the only instance within his knowledge of the efficacy of red tape

in a Government establishment. In the same way are stored the district managers', engineers' and other numbered forms and books, all in their respective series. The racks beyond these, containing envelopes of 230 different sorts, are larger and lighter, and buttressing the section are piles of telegram forms stacked in packages almost to the roof; these latter are delivered in millions and a stock of twelve millions is held.

Postal stores, other than printed matter, are on ledger charge, that is, the receipts and issues must be accounted for and the items are known as "chargeable items." They are varied in character and include pens, pencils, portfolios and files, typewriting and duplicating accessories and other stationery items, certain books, Morse, Wheatstone, carbonic, writing, blotting and packing papers, ink, gum, stamping composition, disinfectants, string, lead seals, sealing wax, postmen's lamps, soap, towels and household stores, scales, weights, date stamps and type, and mail bags. The latter are mostly made in the prisons and the work of stencilling them keeps a small staff regularly employed. Such items are not so conveniently stocked and recorded as are numbered forms or books and many of them, e.g., pencils, differ very slightly from each other in appearance; but the difficulty is overcome by giving each a schedule number which is printed on the requisition, and together with the description appears on the stock cards. Consequently, an item like "string, middle thread thick" comes to be known as "S.P. 270" and is thus recorded; hence the insistence on the insertion of schedule numbers on supplementary requisitions, sometimes perhaps to the irritation of consumers.

The consumption of postal stores varies little from year to year, and stock provision and distribution are not difficult to arrange. Each office is supplied with printed quarterly requisition forms, which must be submitted on a date in the quarter fixed by the Stores Department, thus enabling the work of the depot to be evenly distributed throughout the year. Supplementary requisitions are also used for emergency and other applications.

It may be interesting to follow the course of a requisition through all the stages in the store. In the first place it is scrutinised so that excessive quantities may be reduced and items, not authorised to be supplied to particular applicants, deleted; it is then filed for treatment in its turn by the issuing officer. This officer works with a wheeled cabinet on the top of which the requisition lies, and the stocks being arranged in the same order as the items appear on the requisition form, he goes along the racks abstracting the quantities required and ticking the items on the requisition. If by any chance no stock of an item is available, he merely stars the entry on the requisition. When he has completed his tour of the racks, his cabinet is full and he wheels the contents to the packing table. There, a third class storeman checks the quantities on the requisition against the stores, which are now ready for packing. The starred items are entered on what is called a "noting sheet." For each item of stock exhausted, a separate noting sheet is prepared, showing the several offices to which supplies are due and the quantities required by each. When deliveries arrive, outstanding applications are at once met and the noting sheet filed as an executed requisition. In the case of chargeable items, however, extract requisitions must, for accounting purposes, take the place of the noting sheet.

The stores having been packed and weighed, the number of items and the destination are entered in the packer's book. The consignment is then passed to the transport officer who initials for it and retains the requisition. He prepares a consignment voucher, the duplicate copy of which is handed with the stores to the carrier, who signs for them on the original copy retained in the depot. There is also a triplicate copy used for accounting purposes. At the end of the day, the completed requisitions are transmitted to the office, where the number received is checked against the entries in the packer's book; and the requisitions are then sent to the consignees to acknowledge receipt of the stores.

At this stage, however, a distinction is made between non-chargeable items, which, as already explained, consist of forms, envelopes, and books; and chargeable items, which have to be recorded in the depot ledgers. Chargeable items must be strictly accounted for, and each completed requisition therefore becomes an accounting voucher. The transport duty passes requisitions for such items to the office in a daily cover, on the outside of which are recorded the number of items issued and certain particulars of each requisition enclosed. The ledger clerk posts the quantities issued to the ledger cards and then despatches the requisitions to the consignees, to be receipted; but the daily cover is not filed until every acknowledgment has been returned and marked off. Thus, for every issue on the ledger cards a receipted voucher is obtained. You will observe that the system constitutes a very complete check upon all issues of stores from the moment they leave the racks until the receipted voucher is returned from the consignee, and an examination of the system will, I believe, show that this is accomplished with a minimum of clerical work and without a single unnecessary record.

It is a simple matter to trace a requisition through all its stages, and, as the initials of the issuing and the checking officers appear on each voucher, responsibility for errors can be readily fixed. The number of items issued and the time taken in man-hours are recorded on a chart in graph form, and this discloses any discrepancy between the work performed and the staff allotted to the duty.

We have now reviewed the system so far as issues from stock are concerned and it remains for me to describe the important duties of the stock officer. He is responsible for stock provision, which is arranged under what is known as the stock return system. The stock return books are ruled in vertical columns headed "Description of Item," "Schedule Number," "Minimum Stock," with additional columns for each month of the year. Every stock item is recorded in these books, several of which are required to cover the stocks on each duty. The stock officer reviews the whole of his stocks periodically, generally once a month. Having entered the date at the top of the column

for the current month, he examines his racks, and if the tape enclosing the minimum stock is unbroken, he simply ticks the item—as a quarter's supply is in hand; but if the tape has been cut, he enters in his stock return book the quantity in stock and in the case of forms he inserts a specimen in the book, which at the end of the day is sent to the office. The issuing officer also assists in the work of stock provision to the extent that, if he finds any stock becoming dangerously low, owing to abnormal demands, he enters the description on a slip provided for the purpose. This slip is handed to the stock officer, who passes it to the office after he has suitably noted the stock card on the bin.

In addition to his stock return work the stock officer examines and checks the stores received, sees that they are so put to stock that old supplies are issued first, and arranges for outstanding items recorded on noting sheets to be promptly despatched. He is also held responsible for the proper storage of his items and the tidy appearance of his stocks.

This rough outline of the procedure in the store will, I hope, suffice to give you a general conception of the system. Naturally there are variations to suit particular items and to meet special circumstances, but you will have gathered that an effort is made so to simplify the work that the manipulative staff may deal expeditiously with the great quantities of material which have to be handled. Obviously such a policy throws considerable responsibility upon the members of the clerical staff who have to acquire some practical knowledge of the items and their uses, and to keep in very close touch with the work in the store, in order to meet the demands upon their sections.

To complete our survey of the Postal section let us now review some of the clerical duties; and we may take the printed matter duty as typical of the system of stock provision. There are three main sets of records on this duty—first, the stock return book already referred to; then a cabinet file with a jacket for each form or book, in which are enclosed specimen forms, &c.; and lastly a card index, the card for each item showing the source of supply, decisions as to revisions authorised or proposed, and quantities ordered. If a new form is introduced the item is entered in the stock return book, a jacket for the cabinet file assigned, and an index card prepared; if a form is revised, the card is noted accordingly.

When a stock return book is received from the store, the clerical officer on this duty examines it to see that every item has either been ticked, indicating that the minimum stock is still intact, or that the actual stock in hand has been entered because replenishment supplies are required. Taking each of the latter entries, he ascertains from the imprint on the form the date of the previous supply. If, owing to decreased consumption, the stock has lasted say eighteen months instead of a year, the minimum stock figure is probably too high, so he fixes a revised minimum and advises the store to re-tape the reduced quantity. But if the date of the imprint shows that the previous supply was adequate, the minimum stock is correct and the case a normal one. He now refers to the card index to see if any decisions or instructions are recorded thereon. Should the form be noted for revision at the next reprint, it is referred to the Department concerned for alteration; but if the revision has been already approved, a revised specimen will be found in the cabinet file. The card index will also show whether there is any correspondence relating to the form, indicating, for example, a change of system likely to affect the annual consumption. In short, with his card index and specimens or papers from the cabinet file before him, the clerk is in possession of all the facts necessary to enable him to make intelligent provision for the next year's consumption. Having fixed the quantity to be ordered, he enters it in the column provided in the stock return book and on the relative card, prepares a specimen for press, and after the details have been checked a demand is placed on the Stationery Office.

With stationery stores the system is similar although of course no specimens are filed. The card index on this duty is, however, also used for recording details as to restrictions in supply. For example, several articles are only issued to certain classes of officers and an engineer may requisition items which will be disallowed to a postmaster, and *vice versa*. These restrictions may perhaps be overcome by a friendly system of exchange between superintending engineers and postmasters, but this is an irregularity which the Stores Department has not been so discourteous as to investigate!

I ought to add that for every stock item a life history is kept, recording the circumstances of its introduction, the authorities for restrictions and their removal and other details which prove very useful when dealing with importunate applicants.

There is another important duty on the Postal section which merits reference—viz., that known as the special printing duty. Books and forms bearing the printed name of a particular office or used only in one Department are termed special prints, and it is one of the functions of the Stores Department to discourage the adoption or retention of these. Two files of all specimens of special prints are kept—one showing the specimens under offices and the other under the class of work. When an application is received for a special print, the first step is to consider whether the requirement can be met by a stock item. If not, then it has to be ascertained how a similar need is provided for in other offices; and if a cheaper or simpler book is in use elsewhere, the applicant is invited to adopt it. But this is a matter in which Departments are extremely sensitive, and if a given record has been employed for many years, it is seldom abandoned without reluctance. Very large savings are effected by reducing the number or simplifying the details of special prints and our suggestions are as a rule readily adopted. They have to be made with discrimination, however, for it is no recommendation to Edinburgh to be told that a rival city uses for a given purpose a simpler book or form, and to suggest in some quarters that a Scottish requirement might be met by an English method is to invite opposition! Special prints are, of course, never put to stock—supplies being issued as soon as they are delivered by the printers and examined.

The ledger duty calls for no special comment, and the other work on the Postal section, although varied and important, does not come within the scope of this paper.

There are two sure tests of the efficiency of the postal duties, viz., the promptitude with which requisitions are dealt with and the number of items which, because stock is exhausted, have to be reported as not available. Each duty prepares every Monday morning, for the information of the Officer in Charge, a statement showing the number of requisitions in hand with the date of the earliest, and details of the items of which supplies are outstanding, giving reasons for each case of exhausted stock. An examination of the records at Edinburgh depot shows that supplementary requisitions are generally executed within a day or two of their receipt and quarterly requisitions within a week, and that the average number of items reported as not available seldom exceeds ten. When it is remembered that these consist mostly of new forms or books requisitioned before supplies can be delivered by the printers, I think it may be claimed that the system could not economically be made more effective.

We shall now turn to consider the Engineering section, but before proceeding to examine the details, it is necessary to explain briefly some of the reasons underlying the special methods applied to engineering items. The consumption of engineering stores, unlike that of postal stores, is spasmodic. The supplies required for the maintenance of the Telegraph and Telephone systems form a comparatively small proportion of the total issues under the engineering programme. If several important lines are being erected in the area served by a depot, the demands on the depot affected will obviously be greatly increased while these works are in progress. It is therefore difficult to determine the stock to be held in a depot, and indeed it is only possible because the bulk of the material for special works is drawn direct from contractors. When fixing the minimum stocks for engineering stores it is necessary to take into account the bulk of the stores and the space available, the effect of recoveries fit for re-issue, the risk of deterioration, the time taken in manufacture—a serious factor with instruments—the time occupied in tests, and the likelihood of sudden abnormal demands due to storms and breakdowns. If a requisition for postal stores goes astray, the stores can be despatched upon receipt of a reminder and little inconvenience will result; but should an engineering requisition thus miscarry, the consequences might be serious if a large gang were waiting for material, which, in such an emergency, would partly have to be conveyed by passenger train at additional expense.

The value of engineering stores has to be debited to works orders in order that the proper charges may be made to the Votes and to Telephone Capital Account through the engineers' cost statements; and this entails the pricing by the Stores Department of all issues at rate-book prices fixed to include the cost of freight and handling. Stores recovered and returned to depot must be priced by the engineer and credited by him at new or scrap rates to the respective works orders. Then stores becoming obsolete while in the charge of the Stores Department involve heavy charges against depreciation which must be brought to account by the depot concerned. The sale of scrap stores is also a function of the Department which is specially important in the case of engineering items because of the residual value of copper, lead and other materials. The system of store accounting would itself furnish material for a separate paper, and it is so elaborate that even an outline of the details is impossible here.

We shall now follow the course of an engineering requisition from its receipt in the depot to its execution, and you will see how the accounting and other requirements which I have mentioned are provided for.

With each batch of requisitions the engineer sends an advice known as a requisition slip. These slips, being numbered consecutively by engineers in a separate series for each depot, disclose the loss of any requisition between the engineer's office and the depot. A clerical officer scrutinises each requisition received to see that the demand is not beyond the capacity of the depot, that an authorised account or works order number is quoted and that the "wanted by" date is shown; he inserts the mode of conveyance or confirms the engineer's routing, prepares extracts for items which have to be supplied from another depot or from contractors, confirms that rate-book descriptions have been used and links different requisitions for the same destination. He also arranges to issue, if possible, obsolescent or surplus stores in place of those requisitioned; and if any items on a requisition cannot be supplied from stock he has to consider whether the complete requisition should not be passed on to another depot, in view of the advantages to be gained from the stores being delivered and accounted for as one consignment.

The requisitions are then passed to the store, an acknowledgment being obtained. There they are filed according to the dates on which the consignments are required. In due course the stores are assembled for the packers, and if more than one section is concerned, the requisition is stamped "composite requisition" and passed from section to section, the packing being done by the section dealing with most of the items. As with postal requisitions, the details of the consignment are entered in the packer's book which is initialed by the transport officer when he receives the consignment and the requisition. He prepares a consignment voucher in the usual way and encloses the executed requisitions in a daily cover which is passed to the office at the end of the day. Requisitions for stores called for are recorded in the office before being dealt with, and follow the same routine.

It must not be thought, however, that the work of issuing engineering stores proceeds as placidly as the foregoing paragraphs might indicate. Urgent requisitions are very frequently received for despatch by the first passenger train, often at most inconvenient hours of the day or night; and when an engineer has been promised despatch by a certain train and has made all his plans accordingly, the Stores Department makes it a point of honour to effect delivery to time. These urgent consignments are a fruitful source of the stock

Gell Telegraphic Appliances Syndicate, Limited.

ON WAR OFFICE, ADMIRALTY, POST OFFICE, CROWN
AGENTS, AND OTHER COLONIAL ADMINISTRATIONS
LISTS OF CONTRACTORS.

SOLE MANUFACTURERS OF THE

GELL KEYBOARD PERFORATOR.

GELL Motor - Driven Transmitter.

GELL Motor - Driven Receiver

for Morse and Cable Wheatstone working.

Also Manufacturers of

**LANDLINE, CABLE AND WIRELESS
TELEGRAPHIC APPARATUS.**

Registered Offices:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Sardinia House, Sardinia Street, Kingsway, W.C.
Telephone: Holborn 6826.

Works:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Pine Grove Works, Tollington Park, London, N.
Telephone: North 1196. Telegrams: "Gelltas, London."

EBONITE.

TONS of **SHEET, ROD and TUBING** in London
Stock in various Qualities and numerous Sizes.

EBONITE-VULCANITE owing to its special nature,
can only be made **successfully** after many years of experience.

We have been manufacturing this Material for
OVER 60 YEARS.

AMERICAN HARD RUBBER CO.,

13a, FORE STREET, LONDON, E.C.

"ERONINETH, LONDON."

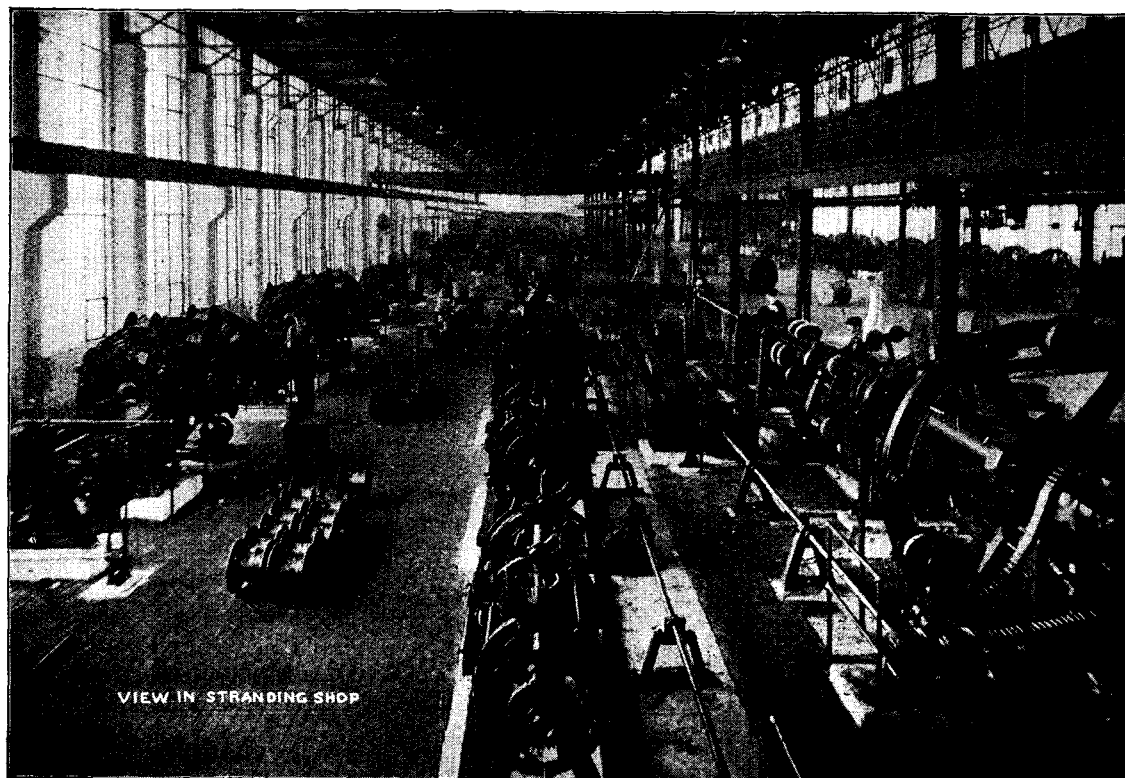
Head Office: 9-13, MERCER STREET, New York, U.S.A.

Factories: Akron, Ohio. Butler, New Jersey, College Point, New York.

Silk and Cotton-Covered H.C. Copper Wire.
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
"ORMISTON, LONDON." 13259 CENTRAL.

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital).

Telephone: 1309 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3s. 6d. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

	PER PAIR
Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses	s. d. 3 6
Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames	7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE. WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

VOLUME V.

THE SUBSTATION

BY

A. V. ABBOT,

Formerly Chief Engineer, Chicago Telephone Co.

405 pages. 5 × 8.

310 illustrations.

Price 6/3 net.

CHAPTER I.—Introduction. II.—The Receiver. III.—Telephone Transmitters. IV.—Induction Coils and Sub-Station Circuits. V.—Transmission and Current Supply. VI.—Signalling Apparatus. VII.—Protection. VIII.—Party Lines. IX.—Sub-Station Assemblage. X.—Costs of Installation and Operation.

OTHER VOLUMES ARE

Volume I.—Location of Central Offices.

Volume II.—Construction of Underground Conduits.

Volume III.—The Cable Plant.

Volume IV.—Construction of Aerial Lines.

Volume VI.—Switchboards and the Central Office.

WRITE FOR CATALOGUE TT, IT WILL INTEREST YOU.

Get the "American Electricians' Handbook," price 12/6 net.

HILL PUBLISHING CO. LTD.

6-8, BOUVERIE STREET, LONDON, E.C.

THE Telephone Rendered Audible under Gunfire

BY THE USE OF

MALLOCK-ARMSTRONG Patent EAR DEFENDERS.

(MR. A. MALLOCK, F.R.S.—SIR W. G. ARMSTRONG, WHITWORTH & Co. Ltd.).

SMALL SOUNDS ARE PRESERVED.

WHEN WEARING THE DEFENDER THERE IS:—

NO TEMPORARY DEAFNESS, NO LOST TIME,
NO MISUNDERSTANDING.

IT IS WORN IN COMFORT UNDER THE RECEIVER OR GAS HELMET.

CONSTRUCTED ON ACOUSTIC PRINCIPLES.

Supplied to every Ship in H.B.M. Navy.



Involves no inconvenience to the wearer.

Remove the Defenders from the Clips and place one in each ear.



In Metal Pocket Case with "Safe-find" Rubber Clips, as illustrated,

4s.

Per Pair.

Post Free,

4s. 2d. with full particulars.

Many thousands already in use in the firing line.

Indestructible.

From Stores, Outfitters and Surgical Instrument Makers, or from:—

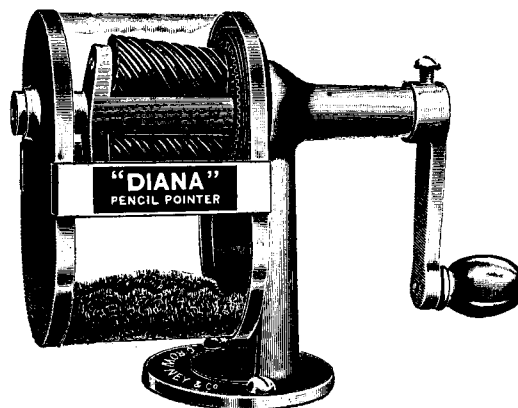
MALLOCK-ARMSTRONG EAR DEFENDER CO.,

FACTORY: 5 CARTARET STREET, WESTMINSTER.

GEORGE ROWNEY & CO.'s

"DIANA" Pencil Sharpener.

A MACHINE—NOT A TOY.



Selling Price **7/6** each net.

GEORGE ROWNEY & CO.

ARTISTS' COLOURMEN AND PENCIL MAKERS.

(RETAIL)

(COLOUR FACTORY)

(PENCIL FACTORY)

GERRARD 4893

Western - 2600

City - 7823

Hampstead 2681

Head Office:

10, 11, PERCY STREET.

61, Brompton Rd., S.W.

10, Diana Place, N.W.

Malden Crescent, N.W.

discrepancies which trouble auditors. It may be asked: If the stores are properly stocked, the descriptions shown on the bins, the issues carefully checked and the ledger correctly posted, how is it possible for differences to arise? The explanation is nevertheless simple to one who has seen a consignment being hurriedly assembled and packed on a wintry night by men who have been brought from their homes and perhaps from their beds. While the lorries are waiting, with probably little time to reach the railway station, men may be seen groping their way by the aid of a lamp, round the stacks of material in the yard. Some particular cable has to be found and the drum placed in position and raised upon jacks for unwinding. The measuring tape, handled by a man stiff with cold, must be read by lamplight and it is not surprising if the incident results in a surplus or a deficit at the next stocktaking. A storeman assembling items almost identical in appearance and varying slightly in size—such as arms or bolts—may easily cause what is termed a "crossing" in the records by a simple error in issuing.

These urgent requisitions, however, invariably disclose remarkable keenness on the part of the staff. A trunk call comes from an engineer in a distant town who begs us to get a formidable list of stores despatched by a certain train leaving in two or three hours. Frequently these urgent demands arrive after hours when a depleted staff is on duty. A requisition is hurriedly constructed in the office and the items are divided amongst the storemen available, who at once proceed to assemble the stores; and if necessary, extra men are sent for. While this is going on, a clerical officer estimates the bulk and weight of the stores and orders the required number of lorries. He then warns the railway company to expect the consignment, asks for extra vans to be added to the train and perhaps even insists upon an express being specially stopped at the required station. Meanwhile in the store there is considerable animation. Every man is working at top speed, assembling, weighing, measuring or counting and packing; even the watchman is commandeered—and if he were not, would beg to be allowed to assist. Any clerical officers on the premises soon find their way into the store if only to address labels. But it is not an unusual occurrence in such emergencies for clerks to assist in weighing and loading, and I have seen a perspiring third class clerk displaying commendable agility in throwing arms or coils of wire into a van. Such an incident presents a striking contrast to the cloistered calm enjoyed by one's colleagues in a headquarter's office, but few men will be found to regret their experience of the excitement and anxieties of these periods of pressure in a depot.

We cultivate the most cordial relations with railway companies and shipowners, who are invariably helpful, but experience has taught us never to lose sight of an important consignment until it is actually on the train or boat. It is frequently necessary to send our own storemen to passenger stations, where there are few facilities for loading heavy stores and where the staff lacks that respect for cases of apparatus which is second nature to the members of this society.

(To be concluded.)

REVIEW.

An Elementary Manual of Radiotelegraphy and Radiotelephony. By J. A. Fleming, M.A., D.Sc., F.R.S. Published by Longmans, Green & Co. Third edition. Price 7s. 6d. net.—There is probably no one interested in the subject who is not acquainted with Dr. Fleming's monumental treatise on *Wireless Telegraphy*, the most elaborate exposition on this branch of electrical science in the English language. Unfortunately, however, the price of this book is out of reach of most wireless students, while the ground covered by it is far beyond that required by the average wireless operator.

Dr. Fleming recognised the need for a smaller book on the same lines as the larger volume, and in 1908 the first edition of the present book appeared. At the time of its publication it was one of the best books available for the student, and although since then many other books on wireless telegraphy have been written, it still remains in the front rank of text-books on the subject.

The whole field of the theory of wireless telegraphy, including wireless telephony, is covered in an elementary manner, and the student who conscientiously works through this volume should be able to proceed without difficulty to the study of more advanced books, or original contributions to the literature of the subject.

There are, however, a few points where we consider some improvement could be made.

Nearly the whole of the section dealing with the measurement of wave lengths is devoted to the Fleming "cymometer"—essentially a laboratory instrument. A brief description of the Donitz wavemeter is given, but no mention is made of the Marconi wavemeter, although the reader is far more likely to meet with this instrument in the course of his practical work than the two of which descriptions are given.

In the diagram illustrating the construction of a condenser, Fig. 19, page 66, two metal plates are shown between each glass plate, instead of glass and metal plates being arranged alternately.

On page 136, first paragraph, the statement is made that there is a difference in phase of 90 degrees between the electric and magnetic components of an electric wave. This misconception as to the nature of an electric wave occurs in much of Dr. Fleming's earlier writings on the subject. In the present edition of this book, however, on page 138, the correct statement is now made that the electric and magnetic components are in step with each other. It is unfortunate that the erroneous statement mentioned above has not also been corrected.

On the whole, however, the book is very good, especially for those taking up wireless engineering or who are studying the subject from the more academic point of view. Its utility to wireless operators would be increased if more information of a practical character were given.

LONDON TELEPHONE SERVICE NOTES.

"WELL DONE, LONDON!"—It was in such terms, we read, that a highly placed Army officer in France recently addressed the men of the 49th Division—a Territorial Division including regiments dear to our hearts, for they number amongst their members many who in civil life rub shoulders with us. We know that these regiments have recently gone through the "fine frenzy of battle"; we know they have quitted themselves like men, and we echo—"Well done, London!"

If rumour should prove true one of their number (of clerical associations in the L.T.S.) has been recommended for high honour. We hope it may be so, and await the consummation of our hopes. Meanwhile the exodus from the Telephone Service to the Army Service continues and our ranks grow daily thinner. The men of the Accounts Branch seem to have shown a marked partiality for the "R.N.A.S.," and a visit to their depot at an erstwhile place of entertainment afforded a possible explanation of this preference, or at any rate it provided evidence that the absent accountants might still in the denomination of their dormitories enjoy the delights of designations dear to the divinities of Queen Victoria Street. Yes, indeed, one saw on all sides huge placards, bearing the magic symbols "A.C.," "A.K.," "A.L.," "A.N.," &c. In fact, the Air-men say they might at times imagine themselves again in an atmosphere of ledgers and advice notes but for a difference in treatment by their Superintendents, or whatever their Petty Officers (First Class and otherwise) may be called. There is no disposition to complain of the change.

We understand that the L.T.S. Roll of Honour is reaching completion and that preliminaries are in hand for its unveiling at no very distant date. The names already inscribed thereon approach 800—who shall say what they will ultimately total?

It is clear from a perusal of last month's issue of this JOURNAL that there are shocks of alarming intensity in store for some of us in the Telephone Service, quite apart from the shocks of war. That engaging essayist "J. J. T.," in a description of "a profitable evening," assures us that a speaker taking part in a discussion at the last meeting of the Telephone and Telegraph Society, "was handicapped by stepping early into the breach before he had fully recovered from the whirlwind of 'another speaker's eloquence.'" It seems clear that someone has failed to recover from the whirlwind of that eloquence, but we are not quite sure whether J. J. T. correctly gauged the situation. In any case it makes one wonder whether, notwithstanding the fact that the Post Office has already sent more than 54,000 of its sons to do battle for Britain, it is not even now selfishly withholding a weapon of offence mightier far than the sword. Perhaps as a preliminary another P.O.E.V.T.C. could be organised—the "E." in this case to stand for "Elocutionists" instead of "Engineers"!

It has always struck us as peculiarly unfair that a picture of a bright, energetic and enthusiastic girl telephonist should be labelled "Telephone Trouble" and circulated broadcast throughout the London district. It is little consolation, even if it be the case,

to know that "a journalist" is responsible. Had the illustration shown a male night telephonist or better still a male emergency operator, such as he whose story we read in the JOURNAL a month or two ago, one could scarcely quarrel with the description, but as it is we enter an emphatic protest. Incidentally, we cannot refrain from relating a little scene which was enacted a while ago at a station on the Inner Circle. A male passenger hastily leaving the train dropped on the platform a small pamphlet which from its size and the colour of its cover was evidently "Telephone Trouble." It was retrieved by a young lady who from her engaging manner one might justifiably suppose to be a telephonist, and as she restored the booklet to its owner she asked whether he was content to leave his "Telephone Trouble" behind, to which he gallantly replied that he was sure this was the only occasion on which it was possible that he would ever receive telephone trouble at her hands.

We referred last month to the formation of an L.T.S. War Savings Society, and this continues to flourish notwithstanding the efforts made to extend its membership. It is not an easy task to urge saving as a duty for those whose remuneration is (to put it modestly) no more than it ought to be, yet this is the task which has recently been undertaken by a number of ladies and gentlemen from the Central War Savings Committee. That some of them knew exactly the right thing to say and the right way to say it cannot be disputed, but the same could not be said of all, and certain of the speeches were sadly reminiscent of the district visitor who, when calling on an elderly parishoner, opened the conversation with the statement "And so you're a poor old man, are you?" However, as one of these special speakers (she must have had telegraph associations) remarked—"the telephone staff are a singularly intellectual 'lot of people'" and they are not the least bit likely to let the shortcomings of speakers interfere in any way with their effort on behalf of their brothers, relatives and friends fighting in the trenches, for that is what war saving amounts to. We save money to save life and to save time. The life may be the life of our nearest and dearest, and the time saved will be in the period during which such an one is absent from our midst. Surely if we can do anything which will help in these directions we don't need special appeals to do it, and we are sure that the results to be obtained by the L.T.S. War Savings Society will prove this fact over and over again!

RETIREMENT OF MISS B. H. NICHOLAS.

On June 1 an interesting gathering was held to bid farewell to Miss B. H. Nicholas, late Supervisor, on her retirement from the C.T.O. School of Telegraphy after 30 years' service. Mr. H. E. Adams, on behalf of the school staff and friends, handed Miss Nicholas a handsome gold signet ring, a card case, and a beautiful bouquet of roses. Miss Nicholas thanked the friends in a bright little speech. Mr. F. P. Cooper, Overseer, then spoke in support of the presentation, and before closing his remarks handed to Mr. Adams a case of pipes, tobacco pouch, and cigarette lighter, from the school staff, past and present, on the occasion of his leaving the school to take duty in the Gallery. Mr. T. G. Beavis, Overseer, following, endorsed the feelings of respect and esteem in which both Miss Nicholas and Mr. Adams are held by their school colleagues. The function terminated with a welcome to Mr. L. H. Tinson who was present, and who is to succeed Mr. Adams as Superintendent of the school.

TELEPHONE MASONIC LODGE.

The annual meeting of this lodge took place at the Cafe Royal on May 20. The W.M. Bro. W. M. France presided, supported by the following Past Masters:—Bros. F. O. Harke, L.R., P. P. Kipping, L.R., A.-G. Supt. Wks., F. A. B. Lord, L.R., C. E. Tattersall, and A. F. Paddon. Bro. F. E. Sims was elected as Master for the ensuing year and installed in the Chair of K. S. by the retiring ruler. The following were appointed officers:—Bros. W. J. Downes, S.W.; M. B. Stephens, J.W.; P. P. Kipping, P.M., L.R., A.-G. Supt. Wks., Treas.; F. O. Harke, P.M., L.R. Sec.; C. E. Tattersall, P.M., D.C.; C. H. Summers, S.D.; V. Baldwin, J.D.; A. F. Paddon, P.M., Almoner; M. F. G. Boddington, Organist; W. Aitken, I.G.; H. J. Dunstan, F. W. Hibberd and E. A. Laidlaw, Stewards; J. R. Shelton, Tyler.

Bro. Kipping was received and congratulated upon being appointed a Grand Officer of England, being the first member of the Telephone Lodge to be promoted to Grand Office. The I.P.M., in proposing the toast of the W.M. Bro. Sims, who had just completed 21 years of Freemasonry, said he felt honoured to instal such a dear old friend, and looked upon it as a very happy termination to his year of office. They would have a capable Master and one who had done much for the success and welfare of the lodge.

PERSONALIA.

NEWS OF THE STAFF.

LONDON TRAFFIC STAFF.

Transfers—

Miss R. J. WATSON (Assistant Supervisor, Class II) has been transferred from Sutton to Victoria.

Miss G. F. EGGLETON has been transferred from Sutton to Croydon.

Miss A. C. WEST (Supervisor, Class I) has been transferred from City to Avenue Exchange.

Miss E. L. LUCKING (Assistant Supervisor, Class I) has been transferred from Park Exchange to City.

Miss M. P. BALLS has been transferred from Park to Victoria.

Miss M. A. CLARIDGE has been transferred from North to the Trunk Exchange.

Miss L. H. AMESS has been transferred from Greenwich Exchange to Woolwich Arsenal.

Miss E. EASTLAKE, of Avenue Exchange, has been transferred to Bank.

Miss M. M. ROBERTS, of Avenue Exchange, has been transferred to Trunks.

Miss M. A. HARVEY, of Avenue Exchange, has been transferred to Rainham.

Miss H. WAND, of Avenue Exchange, has been transferred to Central Observation Office.

Resignations.

Miss A. E. WEST (Assistant Supervisor, Class II) has resigned in view of her approaching marriage, and was presented by her colleagues at Museum Exchange with several useful gifts including a spirit kettle.

Miss G. E. CROSS (Assistant Supervisor, Class II) of City Exchange, has resigned to be married, and was presented with a dinner, breakfast and tea service and other useful gifts.

Miss I. E. GREENWOOD, of Hornsey Exchange, has resigned in view of her marriage, and was presented with a silver cake basket and several other gifts.

Miss C. G. King, of North Exchange, has resigned to be married, and was the recipient of many useful gifts including a silver cake basket.

Miss N. C. WHEATLEY, of Museum Exchange, has resigned.

Miss A. R. E. LAMB, of Hop Exchange, has resigned in view of her approaching marriage, and was presented by her colleagues with a dinner service.

Miss E. M. WATTS, of Hop Exchange, has resigned.

Miss M. G. LEVAILLANT, of Hop Exchange, has resigned.

Miss V. L. ARNOLD, of Hop Exchange, has resigned.

Miss M. HIGGS, of Hop Exchange, has resigned.

Miss E. M. GILLAM, of Hop Exchange, has resigned.

Miss R. R. HIRSCHFIELD, of Woolwich Exchange, has resigned in view of her approaching marriage.

Miss B. MOONEY, of Avenue Exchange, has resigned.

Miss E. J. GUEST, of Avenue Exchange, has resigned.

Miss G. SALTER, of Avenue Exchange, has resigned.

Miss G. E. BLACKMAN, of East Exchange, has resigned.

Miss E. A. CLIBBENS, of London Wall Exchange, has resigned in view of her approaching marriage, and was presented with a tea service by the staff.

Miss V. E. WRIGHT, of London Wall, has resigned.

Miss M. CURWOOD, of London Wall, has resigned.

Miss E. M. GREENWOOD, of London Wall, has resigned.

Miss J. M. MORGAN, of London Wall, has resigned.

Miss C. SNOW, of London Wall, has resigned.

Miss I. H. WILSON, of London Wall, has resigned.

Miss R. SINNOTT, of Battersea Exchange, has resigned on account of marriage, and was presented by her colleagues with a tea service and other gifts.

Miss AGNES E. PEARCE, of the Trunk Exchange, was presented with a dinner service on resigning to be married.

Miss KATHLEEN M. PURCELL, of Trunks, has resigned.

Miss ALICE EVANS, of Trunks, has resigned.

Miss GRACE K. TOBIN, of Trunks, has resigned.

Miss D. M. SAYER, of Trunks, has resigned.

Miss E. A. MORGAN, of Trunks, has resigned.

Miss A. M. WRIGHT, of City Exchange, has resigned on account of her approaching marriage, and was presented with several useful gifts.

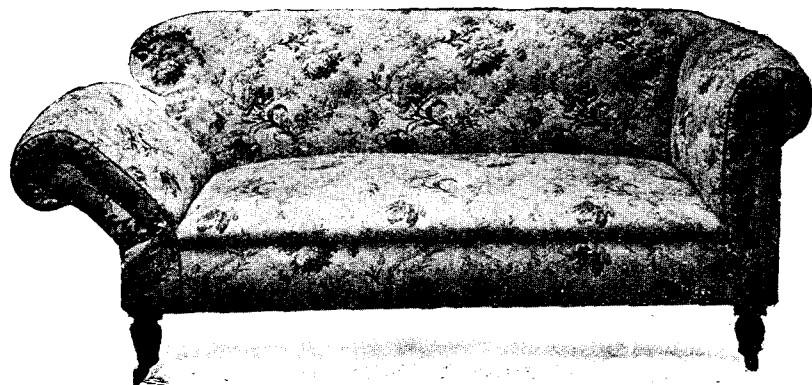
PROVINCIAL STAFF.

Miss HUMPHRIES, Telephonist, Belfast, has resigned in view of her approaching marriage, and was presented by the staff with a handsome barometer.

Miss NELSON, Telephonist, Belfast, on resigning to be married, was presented by her colleagues with a silver lamp.

OBITUARY.

We regret to record the death from bronchial pneumonia of Mr. PERCY DUXBURY, of the District Manager's staff, Blackburn, whilst in training with the Kinnel Park Non-Combatant Corps, Rhyl. Mr. Duxbury had acted as agent for the JOURNAL in Blackburn since its commencement.



For
**Comfortable
Furniture**

of Sound Construction
and Tasteful Design
at Moderate Prices

WE ARE UNEXCELLED.

CHESTERFIELD SETTEE,

5 ft. 6 ins. wide.

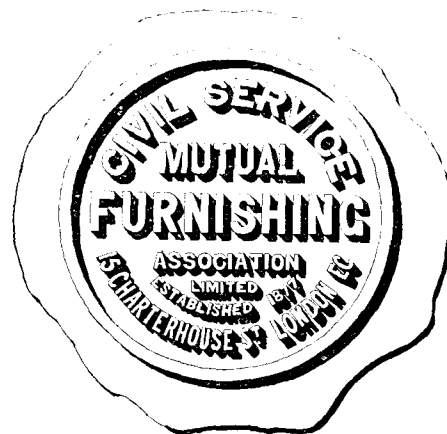
Both ends to drop.

Stuffed all hair. Upholstered in best quality Cretonne,

ONLY

£6:17:6

Carriage paid to any Goods Station in
United Kingdom.



**CIVIL SERVICE
Share Purchase and Investment Society, Ltd.**

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year. 2 Years. 3 Years. 5 Years. 7 Years. 10 Years.
17s. 5d. 9s. 1d. 6s. 3d. 4s. 1d. 3s. 1d. 2s. 5d.

Stocks and Shares bought or sold through the agency of this Society.
Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society exceeds the sum of £600,000.

When your Safety Razor pulls

Don't throw away the old blades: pack them up and send them to us, and we will re-grind and re-set them and return them to you post free, and charge you only **ONE SHILLING** per doz. blades.

EMPIRE RAZORALITIES

(Dept. T.J.)

16 LIVERPOOL STREET ARCADE, LONDON, E.C.

HAVE YOU SEEN THE **NEW STYLES?**

**SPECIAL
TERMS**
to
Telephone
and
Post Office
Staff.



Crichton's New Edition of "The Mode Book" is now ready—all the latest fashions; send a postcard, and a copy will be sent immediately.

Why don't you open an Account at **CRICHTONS'?**

You can order your

New Coat and Skirt, Overcoat, Mac, or Raincoat, Blouses, Underwear, Shoes, Trunks, &c., &c.,

on the "Times" System—quite private and confidential—from **5/- monthly.**

A postcard sent off to-night and full details will reach you by return.

Ladies' Tailors, **CRICHTONS' Ltd.** Furriers and Outfitters,
14, CRICHTON HOUSE, DEVONSHIRE SQUARE, LONDON, E.C.
(One minute from Liverpool Street Station).

WHERE TO STAY.

The attention of our Readers is directed to the following list of Boarding and Apartment Houses.

BARMOUTH.—West-End Boarding Establishment. On sea front. Excellent catering. Highly recommended. Restful, comfortable and pleasant. Moderate tariff.—Winchester.

BARMOUTH (the Beautiful "Glencairn").—The most comfortable and private Residential Hotel in North Wales. Charming situation, overlooking bay and mountains. Large lounge, excellent cuisine. Moderate inclusive tariff. Highly recommended.—Mrs. Dennis, Proprietress.

BOURNEMOUTH.—Eaglescliffe, Durley Gardens; 100 yards from sea. Near golf links. West Cliff. Electric light throughout. Moderate charges.

CLIFTONVILLE, MARGATE.—"Rosenburgh" Boarding House. 110 bedrooms. Situated best part of town. One minute to sands and concert parties. Four minutes to tennis and bowls. Social evenings and dancing in large recreation room. Hot luncheon. Late dinner, excellent cuisine. Special terms to those quoting "T. & T. Journal." Phone 233.

IDEAN FORREST, Severn-Wye Valleys.—Beautiful Holiday Home (600 feet up). Spacious house, grounds, bath, billiards, tennis, croquet, motors, magnificent scenery. Vegetarians accommodated. 35s. to 42s. week.—Photos, prospectus, Hallam, Littledean House, Littledean, Glos.

N. DEVON, BIDEFORD.—Apartments or Boarding. Moderate terms. Near sea, cliffs, park, church and country walks. Numerous testimonials.—Mrs. Frain, Lime Grove.

S. DEVON, TORQUAY.—Furnished Apartments with or without board. Moderate terms. Good recommendation for cyclists. Near sea, downs, golf links, park, church and country walks.—Mrs. H. Bailey, 149, Babhacombe Road, Babhacombe.

EASTBOURNE.—Furnished Apartments, also Bed-sitting Room. Central; 4 minutes station and sea. Terms moderate.—Mrs. Flanagan, 73, Tidswell Road.

EASTBOURNE.—Kuree Boarding Establishment, 55, Jevington Gardens. Sunny position, overlooking sea. Near Wish Tower. Comfortable, moderate.—Mr. and Mrs. Wagstaff.

EASTBOURNE.—Rev. E. W. Moore, Rev. R. C. Gilbie recommend 3 and 4, Queen's Gardens. Board-residence. Restful surroundings, balconies overlooking sea. Central. 21s. to 42s. weekly.—Misses Yelland and Galway.

EDINBURGH.—The Cockburn Hotel, first class Temperance, adjoining Waverley Station.

HASTINGS.—Superior Apartments. Every home comfort. Near sea, station and trams. Delightful situation, overlooking Alexandra Park.—Miss Blackwell, Springfield, 38, Lower Park Road.

LERRACOMBE.—"Arcadia" Private Boarding Establishment, Arcade Road. Grand sea view (right on front). Every comfort, good cuisine, highly recommended. 12 Bedrooms recently renovated throughout.—Mrs. E. Millington, Proprietress.

NEWQUAY, CORNWALL, Jesmond Dale.—One minute from beaches. Near golf, tennis and station. Magnificent views, certified sanitation, electric light throughout. Board residence 5s. 6s. per day. Apartments arranged for.—Address, Mrs. Tuck.

PRESTATYN, NORTH WALES.—Few paying guests received in Christian home. Quiet, restful, comfortable. Good cooking. Bracing, sunny. Sea and mountain air. Terms moderate.—Apply, Misses Breeby & Lacey, "Rockdene," Prestatyn.

TORQUAY.—Apartments conveniently situated in best part of town. Near trams. Commanding fine view of bay. Ten minutes from sea. Cool position for summer. Moderate terms.—Fitzherbert, 5, Lisburne Crescent.

VENTNOR, ISLE OF WIGHT.—Ellerslie Boarding House, St. Boniface Road. Best and healthiest position. Sea view. Good table. 25s. to 30s. weekly.—Miss Walmsley.

WENSLEYDALE.—Board-Residence. 1,400 feet above sea level; between Aysgarth and Airedale. Magnificent views. Waterfalls and ruins in neighbourhood. Recommended by officials.—Particulars from Miss Smith, Thoralby, Aysgarth S.O.

WESTON-SUPER-MARE.—The Lynn Boarding House, 22, Salisbury Terrace. Best position on sea front (facing Grand Pier). Convenient for all amusements. Every comfort. Liberal table. Week-ends from 10s. 6d. Highly recommended. Billiards.—Mrs. N. Evans, Proprietress.

"VISITORS TO LONDON."

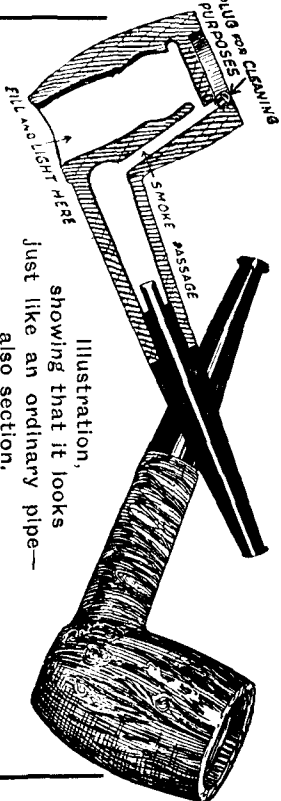
TRANTER'S TEMPERANCE HOTEL,

6, 7, & 9, Bridgewater Square, Barbican, E.C.

MOST CENTRAL FOR BUSINESS OR PLEASURE.

2 minutes' walk from Aldersgate Street Railway Station; 7 minutes' walk from St. Paul's Cathedral and G.P.O. Very convenient for Shopping Centres, Amusements, and all Places of Interest. Terms: Bedroom, Breakfast, and Attendance, from 4s. Other meals optional. Tea, from 1s. to 1s. 9d. Electric Light. Night Porter. Established 1859. Telegrams: "Healthiest London." Phone: Central 959. Write for "How to Spend a Week in London," with Tariff and Testimonials Free. Quiet, Home-like, and Comfortable. This Old-established Hotel is again under the Management of

G. T. S. TRANTER, Proprietor.



Illustration, showing that it looks just like an ordinary pipe—also section.

If you haven't joined the **REAL PIPE-JOY** Brigade of Smokers

IT DOUBLES YOUR PLEASURE

Gives you the full unspoiled fragrance of the tobacco, and saves a quarter of it; smokes perfectly in rain and wind; no hot ash in your eyes; positively banishes "juice"; every shred of the tobacco is enjoyed; does not require constant relighting, even in wet and windy weather; or cleaning. Put a P.O. or cheque to this advertisement. You take no risk because satisfaction is guaranteed or money refunded.

Last Word THE UPSIDE-DOWN PIPE.

Recommended by London's leading Journals, & thousands of your pals. Made from selected French briar. Guaranteed Quality, finest in one pound. Sent by insured post. "Popular" Grade, mounted, 7/6.

T. A. WYSE, 6, GERRARD MANSIONS, LONDON, W.

THE Telegraph and Telephone Journal.

VOL. II.

AUGUST, 1916.

No. 23.

CONTENTS.

	PAGE		PAGE
THE POST OFFICE ESTIMATES	205	EDITORIAL—	
“LA TECHNIQUE TELEGRAPHIQUE EN FRANCE, DEPUIS L’ORIGINE”	207	THE POSTMASTER-GENERAL ON THE POST OFFICE ESTIMATES	212
“BLATTER FÜR POST UND TELEGRAPHIE” (APRIL 1915—APRIL 1916)		HIC ET UBIQUE	212
BY W. H. GUNSTON	209	TELEGRAPHIC MEMORABILIA	214
NEW HEADQUARTERS FOR THE POST OFFICE LONDON ENGINEERING		NEW YORK TELEPHONE SOCIETY	215
DISTRICT	210	TELEGRAPH AND TELEPHONE WORK IN A PROVINCIAL DEPOT. BY	
		J. M. RUSK	216
		CORRESPONDENCE	218
		LONDON TELEPHONE SERVICE NOTES... ..	218

Subscription: To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies: To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

THE POST OFFICE ESTIMATES.

WE reprint, slightly abridged, the speeches of the Postmaster-General and Assistant Postmaster-General in the House of Commons on July 3:—

POSTMASTER-GENERAL’S STATEMENT.

THE POSTMASTER-GENERAL (MR. JOSEPH PEASE): In presenting the annual Estimates of the Post Office I think I should explain to the Committee that the war expenditure and the normal expenditure of the Post Office are inexplicably intertwined, and it may be difficult for any hon. member who studies the Estimates to be able to appreciate fully the separate normal work and the war work which has been done in the past year and may be done during the current year. I think the Committee will be interested if I inform them what is the exact amount of the revenue that has been realised as a result of the extra charges which were imposed in the Budget last autumn. It will be remembered that an additional 1d. was imposed upon letters over 1 oz.—between 1 oz. and 2 ozs.—and there was an additional 1½d. imposed upon letters weighing over 2 ozs. That did not affect the great number of letters, because 86 per cent. of letters which are posted are under 1 oz. in weight. With respect to the newspaper rate, in place of the flat rate of ½d., a scale was imposed of ¾d. for every 6 ozs. The increase of revenue in connexion with those two impositions was estimated to amount to £438,000. The actual increase has amounted to £470,000. An additional 1d. was placed upon parcels sent through the post, and an unexpected revenue has been secured, partly because railway companies have raised their charge and partly because various carrying agencies have pursued the same policy, and because of the difficulty of many traders in securing individuals who will carry their commodities to their customers. Consequently there has been an increase of parcels sent through the post, and instead of £90,000 being realised, as was anticipated, £170,000 has been realised. In regard to the increase of a ½d. on postal orders, the estimate was that £25,000 would be secured. I might say that the number of postal orders up to 2s. 6d. which are affected by this imposition amounts in a year to about 55,000,000. The increased revenue produced by that additional ½d. upon the postal order, instead of being £25,000, was £54,000.

Then there was the surcharge of 3d. imposed on telegrams. It was expected that £170,000 would be realised by that. I cannot say what is the exact effect upon the telegraphic traffic which has

been produced by the imposition of that tax, but no doubt it has been considerable. The result at any rate was that in the six months, from one cause or another, not entirely due to the imposition of this tax, but due to a great number of the short-distance messages formerly sent by telegram being now sent by telephonic communication, there has been a total reduction in the traffic in telegrams of about 25 per cent. But from the revenue point of view the surcharge imposed has been justified, as it has produced £200,000, as against £170,000 which was anticipated. In regard to the increase of £3 in the telephone flat-rate rental, and the increase of call-office charges from 2d. to 3d. in London, and from 1d. to 2d. in the provinces, so far as I can see, the 3d. London rate is not a charge which has come to stay. The traffic will hardly stand that increase, and the addition of these fees, instead of producing an increase in revenue over the estimate, as in the case of the other items, yielded only an increase of £115,000, as against an estimated increase of £205,000. The total increased charges were expected to produce an increased revenue of £928,000. They actually produced over £1,000,000.

Making the accounts as intelligible as I can, I propose now to take them in round figures. The Post Office revenue for the year 1915-1916 amounted to £33,660,000, an increase of £4,000,000 over the previous year, and an increase of £2,800,000 over the pre-war period. The expenditure, including war expenditure, amounted to £30,300,000, showing a balance of profit to hand over to the Exchequer of £3,330,000, compared with the figure for the previous year of £3,380,000, or, for the year before that, of £6,650,000, but it is owing to the war that the net profit has fallen by £3,300,000. It is somewhat curious, in regard to revenue, that had the conditions of growth continued without the influence of the war, and without these extra impositions, they would have practically balanced one another, because the yield of the increased rates imposed and the increased revenue derived from the letters which go to our soldiers abroad have counterbalanced any contraction of revenue which has been caused by the war. This contraction of revenue is due more to the absence of millions of men in the field than to any reduction in the trade and industry of the country—millions of men in the field who, if they had been at home, would have been the users of the postal service and also of the telegraphic and telephonic communication.

On the expenditure side the additional expenditure which was due to the war amounts to about £6,000,000. The Vote

bears certain items due to the war. The balance has been charged to the Vote of Credit. The Vote does not give economies which result in reduction. I think I can explain that by an illustration. The civil pay of the men who were in the Post Office, who are now serving with the colours, still appears upon the Votes presented to Parliament, but they do not include the substituted cost of labour, which is charged to the War Account. Therefore the somewhat paradoxical result follows, that when you reduce the war expenditure of the Department, the economies effected by these arrangements at home do not appear in the Estimate presented to Parliament. The economies which have been effected in the Home Service during the year 1915-1916 amount to rather over £1,000,000, but in the event of the war continuing during the whole of the present year we anticipate that a very much greater saving will be effected by the reductions and economies which have been secured during the last few months. The saving effected will, therefore, be considerably greater in future than that which is going on at the present time, and the saving should accrue at a considerably greater rate than it did during the average period of last year. . . .

I should like now to refer to the wonderful way in which the Post Office employees of military age have responded to the call of their country in enlisting. Out of a possible 90,000 of military age, 56,000 are now serving with the colours; 7,700 have been medically rejected, and 21,700 attested under Lord Derby's scheme, the unattested being only 4,600, and, of course, amongst them must be a great number who have very valid reasons for declining to attest or come forward. Of the 21,700 who attested, 6,000 belong to the Engineering Signalling Section, and are required in connexion with the maintenance of telegraphs and telephones at home, the repairs to which have been considerable owing to the storms to which I shall refer in a moment. Therefore we regard that 6,000 as indispensable at the present moment, and we cannot liberate them for service. With regard to the telegraphists required at home or for signalling service, there are 3,300 who have attested, and we are now considering with the War Office whether any of those can be spared. There are engaged on munitions 500 who are indispensable and who are engaged on work which no one can do quite as well, as they have great technical skill in connexion with the manufacture of minute apparatus for telegraphs and telephones. There are about 9,000 who may be called up for service at any moment. The balance of about 3,000 are chiefly all the older men who for the moment are being retained in the Service but who may be liberated very shortly. The 4,600 unattested men, of whom about 3,750 are married, will come under the Military Service Act. Among those men are a certain number of telegraphists who are no longer required in the Service, since, as I have already indicated, telegraphic communication has dropped from 25 per cent. to 28 per cent. during the past six months, and we are able to spare 250 of those telegraphists who did not attest last autumn. . . .

After paying a tribute to the general public in connexion with the way in which they accepted certain reductions in the facilities which were imposed upon them, the POSTMASTER-GENERAL said: I would now like to pay a tribute to my own staff for the wonderful way in which those at home have risen to the occasion and shown their patriotism in endeavouring to meet the very difficult situation due to the great depletion of the staff. Twenty-five thousand women have come forward, more out of patriotic motives than from any other, in order to take the places of those who had gone, and 22,000 men who are incapacitated from military service by age or defect of some kind have also come forward to fill vacancies at the earliest possible moment for the work they have undertaken to perform, and I think they deserve the commendation which I am able to give them. A fortnight ago I visited a large number of our post offices in France. I was gratified by the reception given to me by the staff who are serving us in France, in an unostentatious way, in a position in which they get little thanks, and in spite of the irregularities of the Cross Channel service and other difficulties, contrive to secure a regular service of letters for the troops. I am glad to say, on behalf of the Army, and on behalf of those

who do the work abroad, I found no disposition to complain, but a cheeriness which forebodes very good results in the immediate future in connexion with the conduct of the war.

Criticisms directed against the policy of the Post Office are generally on trivial points of detail, such as the failure on a particular occasion of some individual to secure communication with another through the telephone. Those criticisms are not in connexion with the main stream of work, which I submit has been in the past efficiently administered by those who are proud to belong to the Service. But when the public, as in some cases they appear to do, expect to secure the same rapidity of service, the same dexterity, and the same accuracy as in normal times, they are expecting too much. The Telegraphic Service has been depleted, and the Government Departments have increased their requirements on the Post Office to a very great extent. It is my duty to try to balance the demands of the Government and those of private customers as best I can. It is also my duty to try to balance the interests of the staff, the interests of the customers, and those of the taxpayers and the quality of the service, so far as is possible. I cannot in these times suggest any heroic reforms to popularise the Post Office, as some of my predecessors may have been able to do with a flowing Treasury. On one hand I am criticised in the Press for a high-handed, arbitrary lack of appreciation of the needs of the nation, for stopping enterprise, and for thinking only of the Post Office staff. On the other hand, I am criticised by some of the trade union journals as being a hard-hearted individual who is not prepared to listen to the fair claims of those in our employ. I hope that, as I receive the two kinds of criticism, I hit more or less the right mean.

In connexion with Zeppelin raids, the work of the women who have come forward voluntarily to do duty at night deserves, I think, very high praise. Hundreds of women have thus come forward. When Zeppelin raids have been anticipated, and sometimes when they have been going on, these women have come out of their homes and even when bombs were dropping gone to their positions in the various exchanges. They have played an important part in an organised scheme of air-raid warnings, and in gallantry and self-sacrifice they have set a good example to the whole country. I might specially mention that in Dublin the women in the exchanges there, while bullets were flying and fires raging, stayed at their work, and it was through communication being kept intact by the telephonic exchange in Dublin that we were able to obtain the military who suppressed the rebellion so rapidly. The work of the telephone is really very monotonous, and I have considerable sympathy with those who give a great deal of attention, application and devotion to their work. I think they ought to receive rather more sympathy from the public than is usually given. In an out-of-the-way country place the other day the exchange operator, after retiring to bed with a bell by the bedside, as she usually did, was rung up three times in a comparatively short period of the night. On the first occasion, at the conclusion of the conversation, she asked the individual who had rung her up whether he was likely to ring her up again, because, if so, she did not propose to return to bed. He thereupon called her a "lazy hound," and reported her for incivility. Such is the lot of many of the telephonists.

I referred a moment ago to the Dublin rebellion. It has been suggested that there were in the Irish Postal Service a large number of sympathisers with the Sinn Féin movement. I believe myself that that is wholly unjustified as a general charge. Nothing could have been more loyal, taken as a whole, than the way in which the men in the Post Office worked to restore the services in Dublin. The engineers in a few days erected 136 new instruments in the new telegraphic central office, which was a remarkable achievement. I think the highest praise is due to the sorters, postmen and telegraphists for their self-sacrifice and the personal risk which they took and which they seemed to feel it an honour to take, with a view to showing their loyalty to the public service. After careful investigation, I have thought it necessary to discharge two or three of the staff. Ten who were arrested have been cleared and reinstated. One was sentenced to penal servitude. Thirty-five against whom there is some suspicion, have been deported; I am

referring all their cases to the Sankey Commission, and awaiting their report before taking action. With a staff of 17,000 in Ireland, nearly every one of whom served as loyally as possible, there must, of course, be a few black sheep, but the number is so small that I think the Committee will agree that there is no justification for any general charge of sedition.

I said that I would refer to the damage done by the storm of March 27 to 28. The storm extended from the Humber to Pembroke, and from the Wash to the Bristol Channel. It swept away almost all the aerial telegraph lines throughout that area; 2,150 poles were broken, 6,050 were uprooted, 33,300 were blown over. Thus the number of poles that had to be re-erected was 41,500. That, of course, does not include the poles on the railways, which were quite independent of the Post Office. The copper wire which was broken into small fragments represented a length of 17,000 miles. The whole of that wire had to be re-melted and re-manufactured and weighed 1,500 tons. We have a normal repairing staff of 20,000, of whom 11,000 are already abroad doing work at the front. Most of our best, most highly trained and most experienced men are at the front. We have 9,000 at home, out of the staff required for the normal work of repairs, and naturally a storm like that of last March, which was the worst the country has ever experienced, has been a great tax upon the staff left at home. They are dealing with the work as rapidly as possible, and I hope that by Christmas the damage may have been made good. Underground communications saved the situation. But underground communications can be made only at great cost. After the war I hope that additional underground communications may be found possible with such places as Northampton, Leicester, Nottingham, Sheffield and Leeds, in order that in the event of any future storm of this character a satisfactory regular service, independent of aerial wires, may be secured. . . .

I am sorry that we have been unable to meet the demands made upon the telephonic departments by the public for new services. With a view to checking these demands we have felt justified in placing a temporary surcharge on the public. In the last few months my predecessor and I have erected something like 7,000 new telephones for the Army, and during the last year 1,500 new telephonic communications and instruments have been erected for the Munitions Department. Hence there has been a great tax upon the staff and upon the number of instruments at the Post Office. Automatic telephones is a subject in which the Assistant Postmaster-General and myself have taken considerable interest. We should like to see the automatic telephone replace the manual telephone, so far as that is possible; but again the expense prevents our launching out in the way in which I think development must take place immediately after the war. There are eight automatic exchanges working, and they are giving great satisfaction. The only ground of complaint that can be alleged against them is, I think, that when the public themselves make a mistake they have no telephonist whom they can abuse. There are six exchanges under construction. I cannot give the Committee any figures in regard to the relative cost. The matter is still in the experimental stage, but we are obtaining the data as rapidly as possible. I believe there is a real advance to be made in satisfactory telephonic communication by a large development of the automatic machines. In Liverpool we hope to be able to get on for another year with the present exchange, but a new exchange must be placed in that city before many months are over. . . . There has been during the past year a steady development of the means of communication. There have been many new inventions which have accelerated and improved the transmission of messages. New engineering appliances have helped us, and there have been various instruments which have expedited and improved the conveyance of mails. There has been on the whole a vast improvement both in regard to the rapidity and the accuracy of communication. Wireless telegraphy has made equal strides, if not greater strides than those of other means of communication, but this, during a time of war, is not the moment at which I can dwell on the improvements which have been made, or what we can do or cannot do now. It has always appeared to me that each development of communication is one of those milestones on the

road of civilisation which marks the real progress of the world. The deplorable world conflagration is regarded by many as retrogressive and discreditable to our civilisation. Be that as it may. We here take credit to ourselves that, so far as the progress of civilisation can be gauged by development both in rapidity and accuracy of communication, this country is not behind any other country in the world.

The ASSISTANT POSTMASTER-GENERAL (Mr. PIKE PEASE), after referring to the tribute paid by the hon. member for Croydon (Mr. Malcolm) to the Postmaster-General and to the Post Office generally for the work which has been done during the last financial year, said: My right hon. friend referred to the fact that he had been to France and had had an opportunity of seeing some of the work done there. I also have had a similar opportunity during the last financial year. I have had an opportunity of going to Boulogne, Rouen, Havre and the railway heads of the various places, and I should like to inform the Committee that, having seen many generals during that visit, I did not hear anything but high praise for the work which had been done by the Post Office staff. When we think that we have sent 500,000,000 of parcels and letters to the war area in France alone, it can easily be imagined the amount of work that has been done. My right hon. friend also referred to the excellence of the work, and he mentioned the fact that a very large number of our staff in France have received signal honours. I think the Committee would like to know what they are. We have received one V.C., one C.B., five D.S.O.'s, one C.M.G., and a great many other Orders, including Russian and French distinctions and Military Medals, which have given great satisfaction to those employed in the Post Office at home. I very much regret to say that we have lost a very large number of men in this war. Reference has been made to the splendid response which was made to the appeal by my right hon. friend who is now at the Home Office (Mr. H. Samuel). The number of men we have lost is very large. The number of men killed in action appearing on the Roll of Honour at the Post Office is: 1914, 460; 1915, 1,272; 1916 up to June 30, 422 and 72—making a total of 2,226. I am sure that the full sympathy of this Committee will go out to the relatives and friends of those whose loss we so deeply deplore.

"LA TECHNIQUE TÉLÉGRAPHIQUE EN FRANCE, DEPUIS L'ORIGINE."

(Concluded from page 195.)

THE Meyer continued to serve many of the more heavily pressed circuits in France until somewhere about the year 1885, about which period it gradually gave way to the system invented by M. Baudot (b. 1845 d. 1903).

The first type of Baudot apparatus was served by a horizontal type of distributor similar to that of the, at one time, familiar Delaney multiplex, and as illustrated in the TELEGRAPH AND TELEPHONE JOURNAL for November 1915.

The Baudot system is by this time too well known to need a minute description. From the historic point of view, however, one cannot refrain from touching upon what appears to the writer to be the most interesting portion of the evolution of this system. M. Montoriol explains the complexities of the first type of apparatus in use in 1877-9 with its five combiner relays, its five combiner brushes and later on its "ten path" (*voies*) receiver or traducteur.

The translation of the electrical signals into mechanical action and the printing of the same as a type-written telegram was effected by an apparatus known as the "combiner," or selecting portion of the apparatus. The first sets were exclusively *electrical* and were in marked contrast to the simplicity of the mechanical "combiner" of to-day. Even the projection of the paper against the type wheel was the effect of an armature movement actuated by a local current.

Reference to Fig. IV should give a very fair idea of the connexions necessary with this old type of electrical receiver.

The blackened portions in combination with the white sections correspond at the points indicated by the lettering, and if taken from left to right, with keys 1 to 5 of a Baudot keyboard in the

position of transmitting the relative letters. The black squares represent the depressed keys or marking positions of such combinations and the white spaces, undepressed keys or spacing positions.

This combiner was cylindrical in form and carried round three-fourths of its periphery five ranges of contacts, the marking portions of each of these ranges being connected to one another and also to the marking stop of their respective and separate relays. In like manner the spacing portions were connected with their spacing stops. The five brushes were connected as shown and acted as a comb, collector, combiner or selector. To take a concrete case that of the letter T. Marking currents would be received in relays 1, 3 and 5, and would throw over the tongues of the corresponding relays to marking, as shown by the dotted lines. Now if the code and plan be examined it will be seen that in no other position save this particular one could the five brushes in passing over the five ranges represent the twentieth letter of the alphabet, and it is at this point only that the position of the brushes on the squares will permit of a completed circuit through the electrical printer A, where the paper band is released opposite to the typographic T on the type wheel at the correct moment in the latter's rotation. A mechanical combiner, then followed, à 10 *voies*, five spacing paths and five marking. This was improved upon by the present *deux voies* or two-path combiner mechanism, the forward path representing the marking positions of the keys and currents, and the hinder path that of the spacing. These two steps were respectively made in 1879 and 1882.

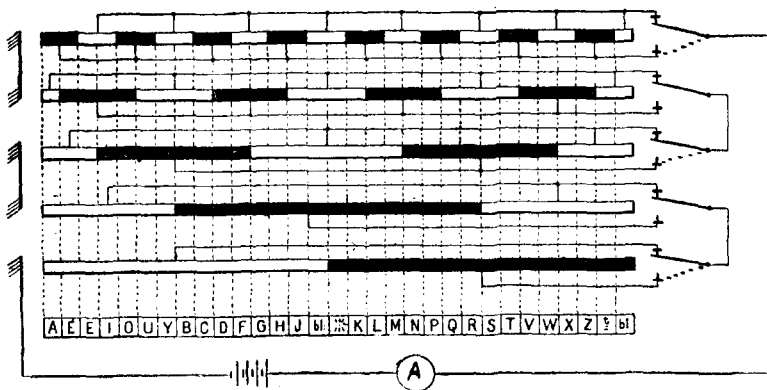


FIG. IV.—THEORETICAL PLAN OF BAUDOT ELECTRICAL COMBINER, 1877.
(A) ELECTRICAL PRINTER.

In studying these developments of the Baudot one cannot fail to be struck with certain similarities in the modern Siemens-Halske system, born apparently of that imitation which is indeed the sincerest flattery!

The patient work of M. Picard in his adaptation of the Baudot system to long submarine cable transmission and the ingenious devices by which direct Baudot communication is maintained between Paris, Marseilles and Alger, &c., receive due attention. The labours of that devoted servant of the French Republic could however receive but inadequate notice in so few pages and deserve a volume to themselves.

Such labours indeed also remind one that the present Baudot system is the result of not one but several busy brains. In this connexion the Dubreuil brothers also come in for their meed of quiet praise on account of the special "traducteur" developed in co-operation with M. Baudot, while naturally Carpentier is not omitted, remembering his cleverly designed typewriter perforator and automatic band feeder.

The history of wireless telegraphy in its relation to officers and scientists of France forms a separate portion of the volume. In brief, the first official experiments appear to have been made by officers of the French Navy in 1898, M. Tissot, by means of his steel filing detector exchanging good signals between Ouessant and l'Ile Vierge, a distance of 42 kilometres.

The following year the Army followed in the person of M. le Capitaine Ferrié, now lieutenant-colonel. This same officer was ultimately responsible for the Eiffel Tower installation and became

Directeur Technique de la Radiotélégraphique Militaire. The names of Branly, Blondel, Ferrié, Jégou, and Meunier are worthy of re-quotation in connexion with different types of detectors, while Carpentier's appearance, in co-operation with Ferrié and the invention of a Frequencemeter give evidence of the former's

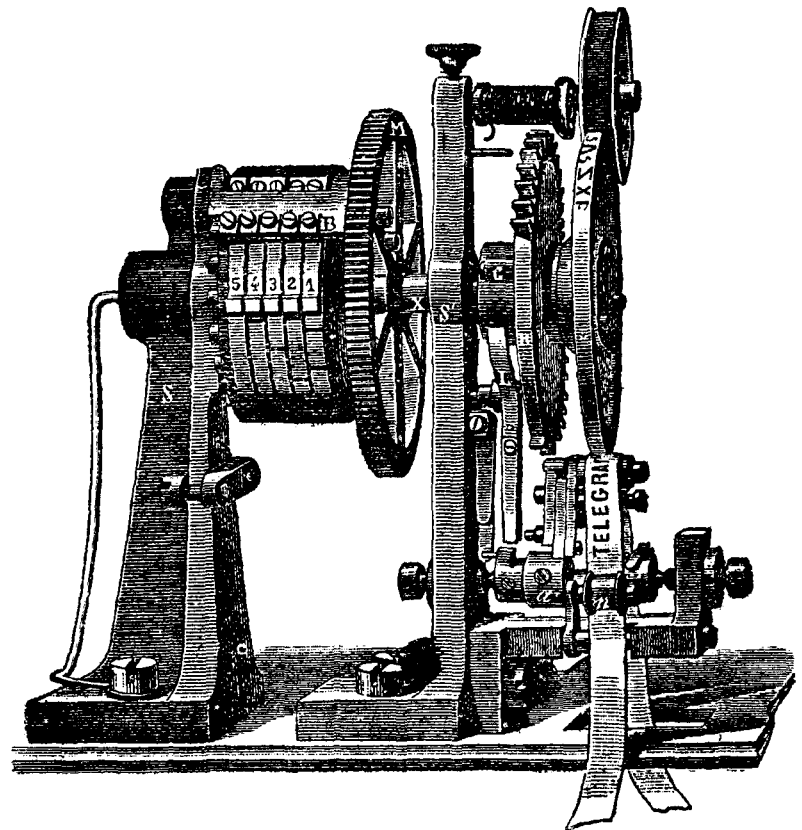
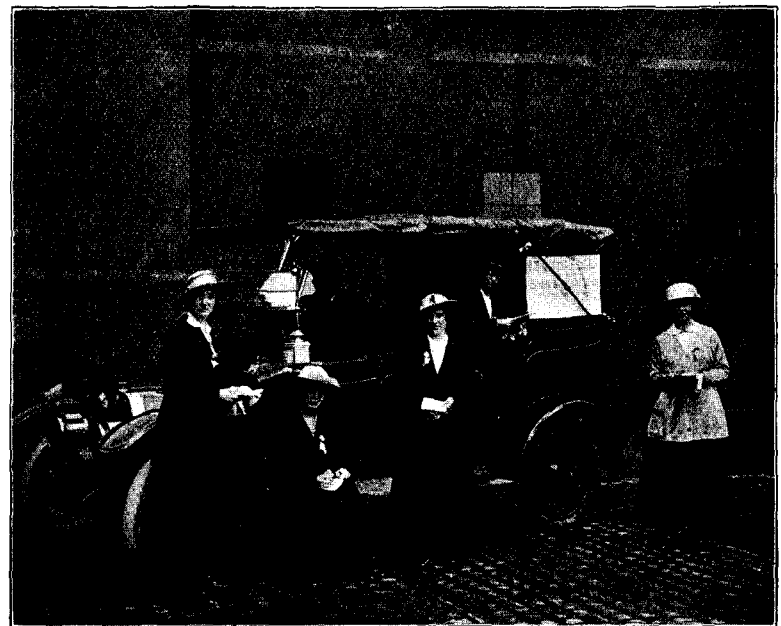


FIG. V.—BAUDOT ELECTRICAL COMBINER AND PRINTER, 1877.

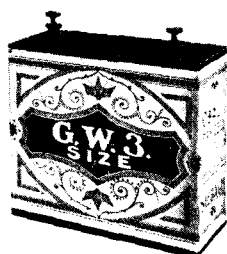
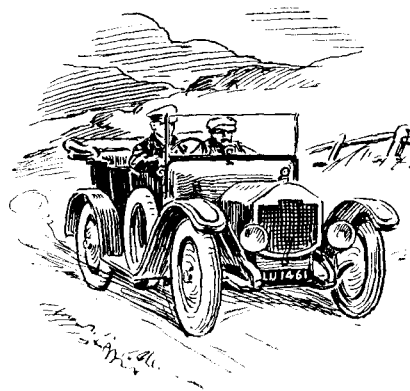
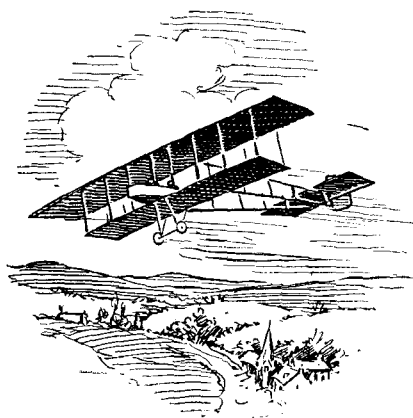
undying interest in telegraph developments. A Wavemeter, also to the credit of the colonel, by no means ends the list of this officer's contributions, nor have I space at my disposal to enumerate the many other names which have added to the lustre of France and her scientists, and which are so modestly mentioned by the author.

J. J. T.

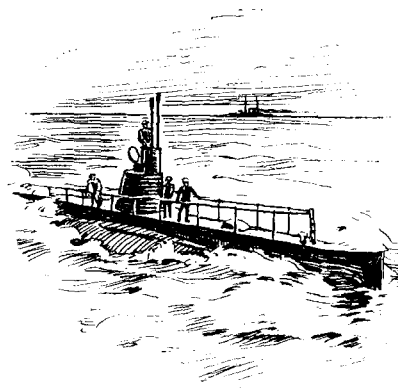
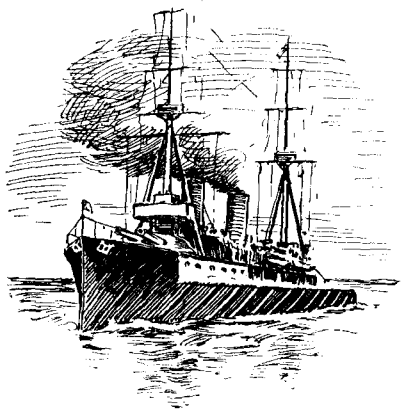


BURTON-ON-TRENT CANVASSING PARTY OF TELEGRAPH AND TELEPHONE STAFF FOR BOOKS FOR THE TROOPS.

SIEMENS DRY CELLS



USED
EVERYWHERE



Particulars from

SIEMENS BROTHERS & CO., LTD., WOOLWICH, LONDON, S.E.

ESTABLISHED 1858.

OVER 4,000 EMPLOYEES.

Telegrams: "SIEMENS, WOOLWICH."

Telephone. CITY 6400 (7 lines).

Home Branches.

BIRMINGHAM—Central House, New Street.
BRISTOL—30, Bridge Street.
CARDIFF—89, St. Mary Street.
GLASGOW—66, Waterloo Street.
MANCHESTER—196, Deansgate.
NEWCASTLE-ON-TYNE—64-68, Collingwood Buildings.
SHEFFIELD—22, High Street.
SOUTHAMPTON—46, High Street.

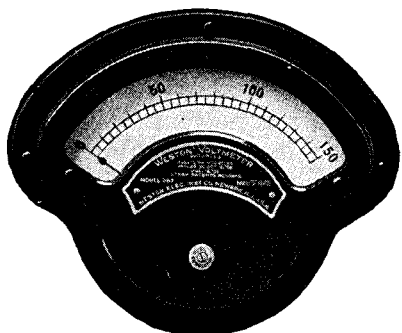
Indian and Colonial Branches.

CALCUTTA—Clive Buildings, Clive Street.
BOMBAY—Rampart Row.
MADRAS—Smith's Corner, Mount Road.
SINGAPORE—1, 2, 6 & 9, Winchester House.
JOHANNESBURG—Siemens' Buildings.
SYDNEY—42, Bridge Street.

MELBOURNE—Dominion Chambers, 59-61, William Street.
WELLINGTON (N.Z.)—A. & T. Burt, Ltd., Courtenay Place.
DUNEDIN (N.Z.)—A. & T. Burt, Ltd., Stuart St.
AUCKLAND (N.Z.)—A. & T. Burt, Ltd., Customs Street West.

WESTON

Miniature Precision D.C. Instruments



MODEL 267 SWITCHBOARD VOLTMETER.

This series of Miniature Switchboard Instruments comprises Voltmeters, Ammeters and Mil-Ammeters.

Overall dimensions, $4\frac{5}{8}'' \times 3\frac{3}{8}''$

DELIVERY FROM STOCK.

WRITE FOR LIST D3.

WESTON ELECTRICAL INSTRUMENT CO.

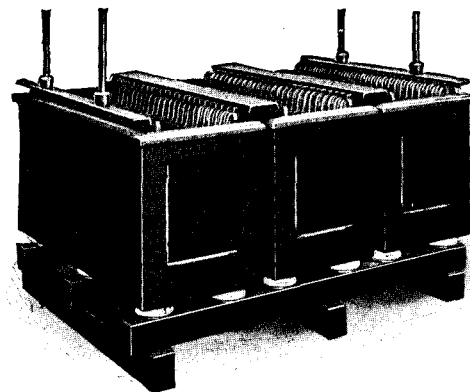
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

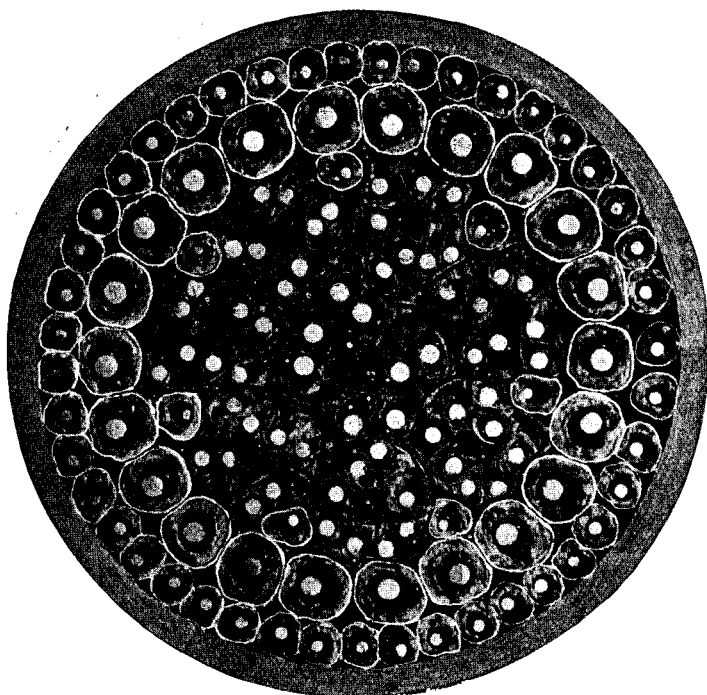
DRY CORE TELEPHONE CABLES.

*Electrical Plant of every description
for Power, Lighting, and Wireless
Installations.*

JOHNSON & PHILLIPS L^{td}

CHARLTON, LONDON, S.E.

ESTABLISHED 1875.



"BLÄTTER FÜR POST UND TELEGRAPHIE" (APRIL 1915—APRIL 1916).

BY W. H. GUNSTON.

A COMPLETE year of this journal (the organ of the higher officials of the German Postal and Telegraph Administration) which has recently come to hand, comprises some interesting information upon German internal economic conditions, besides articles on railway, telegraph and postal subjects. Two of the most instructive articles which they contained, viz., those on the German Administration of Telegraphs in Belgium and on the Budget for 1916 have already been summarised for our readers. A brief notice of some of the remaining features of this journal may also be of interest.

There is, as usual, an article on the classification of the staff for the year, together with the annual complaint of unsatisfactory progress. Figures showing the numbers of the promoted in the different grades and the periods of waiting for promotion are given, and the article concludes: "The picture becomes sadder from year to year; ever increasingly worse are the conditions of promotion. By reason of the extraordinarily tight arrangement (*anhaftenden Gliederung*) of officers in numerous different groups of salaries in the higher ranks, the insufficient conditions of promotion are permanent, and every further delay is bound up with increasing economic injury, which falls on those affected with ever-increasing weight. When will these lists once again reflect a gladdening picture?" Another, entitled "Through," reviewing the position at the end of the year, insists that the Administration must see to it that the higher officials do not suffer further avoidable economic injury.

The war articles are characterised by a dignified resoluteness accompanied by the less dignified boastfulness and venom which we are now accustomed to look for in German references to the great struggle. It is worthy of remark that the phrase "Enemies and Envious" appears to have become almost stereotyped, and that the pretence of unprovoked aggression on the part of Germany's foes is diligently maintained on all possible occasions, whilst the action of Great Britain in stopping and censoring mails is invariably referred to as piratical, contrary to the law of nations, or with some similar qualification.

In May appears a small paragraph on "Discontent of English Post Officials," remarking that, according to the secretary of the Postal and Telegraph Union, the higher officials received £7 to £11 weekly for an average day's work of 5 hours, whilst 200,000 received 18s. to 30s. and had therefore good reason for an increase of pay. These differences, it comments, are "genuinely English." May we not say that the "facts" and their method of presentation are genuinely German?

In the same number another short paragraph refers to a communication in which President Wilson explains to the "German American Chamber of Commerce" the difficulties of censoring in Europe some 50,000 despatches daily, and says that in spite of present conditions the British and French Governments will do all that is possible consonant with military regulations to facilitate the traffic of absolutely neutral despatches. It adds "Absolutely neutral is good. *Sapienti sat.*"

It appears that *holiday leave* in the German Post Office will not be given for the usual period. So far as circumstances permit limited leave will be allowed, which in general is not to exceed half the usual length. In the Departments of Railway, Finance and other Government Offices somewhat similar limitations of leave will obtain.

An article entitled "War and Geography" gives a historical review of the various shifting boundaries of the German Empire. "Many a boundary stone," it is said, "could tell of streams of blood which flowed about it ere it received its present position." The enlarged sphere of activity of the German Post Office extending over Flanders and Poland is naturally referred to. The article endeavours with some plausibility to discredit the principle of boundaries founded on race or language. Germans, it is said

are fighting against Germans, Slavs against Slavs; Caucasians are fighting for the Russians who were formerly their bitterest enemies. Austria, Turkey and Switzerland are cited as States formed of a century-long combination of races speaking different languages. The difference between the first two, with their internecine troubles and precarious unity, and the third does not, however, seem to occur to the author. The same number has an article in small print on the fate of the German Colonies. It is remarked that the British Post Office Guide for April shows "what lands our enemies regard as their property and how they have divided their booty amongst them, viz. :—

British: Cameroon, Togo, German New Guinea and the Solomon Islands.

Japanese: The Caroline, Marian and Marshall Islands."

The constantly recurring question of cable communication is touched on occasionally in short paragraphs, and a proposal for connecting either Gothenberg or Copenhagen directly with America without touching British soil is referred to; not, however, very hopefully.

An article dealing with "German Railways and the War" gives a classified table of goods tariffs with explanatory comments, and proceeds to enlarge on the importance of railways in carrying out the mobilisation of large armies and in the conduct of a war on two fronts. Incidentally it is mentioned that a reduced tariff of 3 pf. per kilometer is allowed to officers and higher military officials, and 1 pf. to privates, telegraphists and to lower officials, or about 4s. 9d. and 1s. 7d. respectively per 100 miles. Presumably this tariff refers to journeys on leave.

The military time table was put in operation on the fourth day of mobilisation. All express trains were suspended and private passengers were carried only by certain trains, if these were not wholly required for military transport. Not for some weeks were fast trains introduced, and then only one a day in each direction; and in the beginning of November 1914 a "peace time table" was re-established, but on a limited scale. Passes were required for travellers to neutral States, and even to Austria-Hungary. The sudden stoppage of goods traffic had the most serious consequences for trade, lack of ore and coal were severely felt and many factories had to close down for a considerable time. The lack of covered wagons requisitioned for the transport of troops was also a serious question, and although in October 1914 24,000 wagons were released for the daily use of the coal industry, the measures taken to reduce the shortage of trucks during the war did not satisfy the complaints of manufacturers. Nothing, however, says the article, is a safer index of the health and strength of our economic life than the intensity of the railway traffic during the year, and the amount of the receipts. It concludes with words of praise for the railway system.

We learn from an extract from the "New Regulations for War Payment of Officials," that the mobilised higher officials will receive an additional payment equal to three-tenths of the fixed war-pay. The old rate of pay was full military pay, seven-tenths of which is chargeable on the civil salary, plus the difference between that seven-tenths and the total of the usual civil salary. The unmobilised officials who are substituting the higher officials receive a monthly war-salary of 84 marks; those substituting lower officials receive 60 marks—in both cases in addition to the civil salary. Particulars of the pay of other grades are also given.

An article "Reserve Force for Telegraph Construction" asks where the necessary forces are to be obtained for carrying on the construction and maintenance of telegraph lines, and suggests the employment of prisoners of war for the purpose. An article on the same subject two months later appears to indicate that the suggestion is actually in practice.

One of the later numbers has a hortatory article entitled "Be German!" The soul and the vocabulary are to be alike pure and alike German; so is woman's dress, and so also is everyone's handwriting which is to abhor the smoothness and roundness of Roman script. The writer concludes with a pleasing picture of news of a victory arriving, bells jubilating and rejoicing in chorus, and pride and joy streaming on all faces.

An article on the "Overland Mail" quoted from the Berlin

Morgenpost states that whereas the British India Mail used to be forwarded *via* Holland, the Rhine, Bavaria and Brindisi (!) it has now, thanks to the fear of German submarines, to be sent *via* the Cape, thus involving a delay of 30 to 40 days. This curious information is inserted in a postal officials' organ without any comment by the Editor, and although in the succeeding issue it is stated that several correspondents have pointed out that the overland mail travelled *via* France and Italy, the legend that it is now sent *via* the Cape is left undisturbed.

The fourth war loan occupies a conspicuous place in the notices. To officials in the Empire and in Prussia, says a note, subscription to the *Fourth War Loan* is rendered easy by pledging advances of salary. Advances can be obtained and pledged up to one quarter's salary, bear interest at 5 per cent. and are redeemable by June 30, 1917, at latest. Subscription can be made at the office of the cashier paying the salary, who is provided with the necessary forms of subscription. The war loan script remains in pledge with administration until the advance is redeemed.

Finally there is an article on "The Rise of Prices and the Staff." The increase of prices of all necessities of life has caused the various "Unions" which had been inactive during the war to resume their activities. The union of middle-rank officials has appealed to the Bundesrat and Reichstag for additional pay, and the Social Workers' Union of lower officials has approached the Government for an extension and increase of the war bonus allowed in respect of children. The article points out that the higher officials are no better off than the middle staff, and complaint is again made of the unsatisfactory slowness of promotion and other unredressed grievances.

Up to April 11, 1916, 123 higher officials, 1,617 of middle rank, and 5,868 lower officials, or 7,608 in all had fallen in the war: 131 had received the Iron Cross Class I, 10,696 the Iron Cross Class II, and 2,736 had received other orders. The fallen represent 13.7 per cent. of the higher staff.

NEW HEADQUARTERS FOR THE POST OFFICE LONDON ENGINEERING DISTRICT.

On the afternoon of Thursday, June 22, The Rt. Hon. J. A. Pease, M.P., Postmaster-General, formally opened the new offices which have been erected in Denman Street, London Bridge, to accommodate the Headquarters' staff of the Post Office Engineering Department, London district. The building, which was commenced before the war, is of red brick with stone facings, and provides accommodation for a staff of 350 members.

The Postmaster-General, who takes keen interest not only in the actual work of the Post Office staff but also in their comfort and well-being, arrived some time before the time fixed for the ceremony, and with Mrs. Pease, who accompanied him, visited the working rooms, and ascertained by conversation with various members of the staff, the nature of the work carried on in the Superintending Engineer's Office. Mrs. Pease was presented with a bouquet of roses by Mrs. Hoddinott on behalf of the lady members of the staff, most of whom are replacing men-clerks on active service.

The Mayors of Bermondsey and Southwark and other visitors and the supervising officers of the district were presented to the Postmaster-General by Mr. A. Moir, Superintending Engineer of the district, who presided over a meeting afterwards held in one of the large rooms specially decorated for the purpose, at which the following speeches were made:—

Sir WM. SLINGO said:

The building in which we are now assembled may perhaps appear somewhat palatial to those who enter it for the first time; but the growth of this Department has been somewhat—I was going to say—appalling. In 1893 the estimated total expenditure of the Engineering Department of the Post Office was £636,000, which is hundreds of thousands less than the expenditure of this district at the present day. The expenditure of the Engineering Department in 1913-14 was £5,740,000—far and away beyond anything ever attempted or dreamt of before. The following year—£6,600,000. If in peace time we go on at that rate there is no saying how long it will be before this building will be absolutely inadequate, and then you will have an opportunity of welcoming another Postmaster-General, another Secretary, and another Engineer-in-Chief to warm up your new premises. (Laughter.)

However that may be, I think you will extend to Mr. Pease and Mr. Murray your best thanks for the interest which they have shown, and which they continue to show, in the Engineering Department and particularly in the London district. (Loud cheers.)

Mr. CROPPER said:

It is rather difficult for the architect to make a speech at this time. The architect has been speaking for about two years on this building—rather

more or less silently—in bricks and stone and timber—and whatever he may think of the building he cannot say, but has to leave it to you. I really should write after I have done my work here, as Euclid used to write after his problems—"Which was to be done." I have stated the problem, and proved it, and now I think it remains for you to pass your verdict upon it.

The site contains about 8,000 square feet, and the problem was to get 45,000 square feet floor space. That we have accomplished by means of seven floors—two underground and five above. The building is on very



THE POSTMASTER-GENERAL AND MRS. PEASE, THE SECRETARY AND THE ENGINEER-IN-CHIEF TAKE TEA WITH MR. MOIR AND THE STAFF OF THE LONDON ENGINEERING DISTRICT.

solid ground because we went down to the gravel, which makes the bed of the Thames. We went through soil which had formed the river bank, and in that we found remains of Roman coins, some Samian ware, and a young man's skull, which was of Roman origin.

The building has cost £26,000—less than the estimate which the architect made. The sketch plans were all approved, the estimate made, and the working drawings made by my predecessor, Mr. Rutherford.

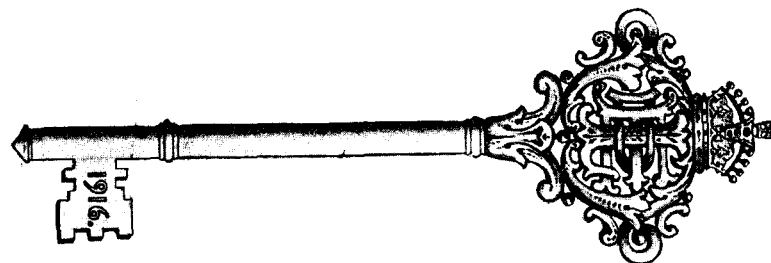
I hope you will find it healthy and bright, and I know there is a great deal of hard work done in it. (Applause.)

The MAYORS of Bermondsey and Southwark welcomed the Postmaster-General to the south side of the river, and expressed pleasure at being present at the ceremony.

The POSTMASTER-GENERAL said:

I am very gratified by the kindness of the welcome which has been extended to me, and the reception which has been given me this afternoon.

The building provides for a staff of 350 individuals, but owing to the war our staff has been depleted, and we have now only 200 in a building



SILVER-GILT KEY PRESENTED TO THE POSTMASTER-GENERAL AT THE OPENING OF THE NEW HEADQUARTERS.

which I think ought to be staffed by at least 325 if we were living in normal times and doing our normal amount of work. The staff consists of 160 men and 40 women. The old building now provides for three district engineers and assistants, and we have saved a certain amount of money by relief in rents in connexion with premises which have been vacated.

When the war broke out there were in the Metropolitan district in the Engineering staff only thirteen women engaged. There are now in the whole district 141—clerks, typists, traacers—and light engineering duties are performed by these ladies and I am told, to the complete satisfaction of their superior officers in the establishment. (Applause.)

In July 1914 the total number of all ranks in the London Engineering district was 5,541, and of these nearly one-half—2,132—voluntarily joined the colours. Among them they have secured 25 commissions. I am sorry to say that many have already fallen in the war—58 having become victims, whose faces we shall never see again. They have died in the battlefield, they have gone to their long account, but their memories will be in the hearts of those with whom they have been associated and their friends will realise that they sacrificed all and died for their country. Sixty-eight others have been invalided home, no longer fit for military service, and have resumed civil employment; and I am glad to say that for deeds of valour some have been recognised. Seven have received the D.C.M., whilst others have been mentioned in dispatches or recognised in some other way. (Loud cheers.)

I must also pay a tribute to the staff here who are at home, and commend them for the great interest they have taken in the Post Office Relief Fund. Among them there are 4,061 subscribers who are contributing to the Relief Fund £2,515 per annum, a most creditable thing, and I do thank you.

For my part it seems to me that the work which the Engineering staff do is just as essential in securing victory as that of the men who are fighting in the trenches. Communications are more and more essential in civilised life, and whether we are at peace or war it does seem to me that increased facility of communication is a mark of the progress of civilisation. To-day trade transactions cannot be carried on without the work which you are performing; the production of munitions becomes impossible; the supplies to our troops in the field; supplies to our men in the hospital whether in France or at home; and also the communications with our various Allies depend very largely upon the work which you perform, and I congratulate you for the way in which you have worked during the war and for the admirable work which you are doing.

The expansion and growth of the work has been very remarkable. Take for instance telephonic communication. From January 1912, when the National Telephone Company was acquired, until the outbreak of war, we opened new exchanges of a large character at Avenue, Regent, Victoria and Museum; smaller exchanges at Park, Chiswick, Putney, Greenwich and Wimbledon. We entered into arrangements to open nineteen other exchanges, and they would have been proceeded with if not for the war. In addition to that additional complicated plant has been provided in all the other exchanges, and we have completed a new service underground that may be indicated by the following figures. We have actually removed 14,000 miles of overhead wire in that period, and we have added 36,000 subscribers to the London Telephone Service. The equipment of apparatus and instruments maintained by the Post Office Engineering staff consists of 53 telephone exchanges together with 12,000 private branch exchanges. 251,142 telephones are maintained in the district, which is one-third of the whole Telephone Service of the United Kingdom. Over 300 million calls originated in the Metropolitan area last year.

In the Telegraph Department.—There are in London over 600 telegraph offices, and the Central Telegraph Office is, I believe, the largest telegraph office in the world. It deals with one-third of the 91 millions of messages which are sent out every year in the United Kingdom. The total length of cables in the district is 70,849 miles, and the single wire mileage amounts to 1,037,790 miles. Under normal conditions the annual expenditure for new construction and maintenance by the Engineering staffs amounts to rather over £1,000,000.

The efficiency of the services rendered I think is also a matter of congratulation to the staff. When we took over the National Telephone Company's exchanges the number of complaints received from the public averaged 1.25 per 1,000 direct lines per working day. It has gone down by more than half and now only averages .5. (Applause.)

As a Minister it is difficult to refer to some of the work which we are doing. In war-time one never knows to what extent anything one may say may bring to the enemy suggestions which we would rather he should not entertain, but I think I may say this, that in connexion with Zeppelin raids a system has been established—for which Colonel Ogilvie is very largely responsible, with other members of the staff—by which all munition works receive an intimation which enables them to put out their lights before the Zeppelin actually comes within their immediate area. (Applause.)

For the work which we have been doing we have received from high quarters the highest praise during the war, and I myself have received two letters from Lord French during the last few months expressing his hearty appreciation of the work done by the Post Office Engineers. I therefore think that we may assume here that our work is good work, and that the public ought to be indebted to the unceasing devotion to duty by every member of the Engineering staff over which I have the honour to preside. (Loud cheers.)

The SECRETARY said:

I am very grateful for the reception you have given me, and I should like to express my pleasure in attending this function. I also wish to offer my congratulations to Mr. Cropper, the architect, at the completion of this building. I have some reason to believe that it has caused him more anxiety and more trouble than most buildings for which he is responsible, and in spite of that he has completed it at a price within his estimate, a rare if not unique performance.

I should like to add one word of appreciation of the work which the Engineering staff of the London district have performed in recent years. We know the difficulties which they have had to contend with. The transfer of the National Telephone Company occasioned an enormous access of work and when the development of the telephone system had been proceeding

on uniform lines there came the war, and we all know the exceptional difficulties they have had to contend with and the demand made on them since the war broke out. These demands have been met to the satisfaction of everyone, and the Postmaster-General has mentioned the tributes which the staff have received from high quarters on the work they have performed.

This building is the result of the unification of the London Engineering district which took place two or three years ago, and the policy which was then determined upon has proved an unqualified success and the staff under the direction of Mr. Moir has worked to the satisfaction of the Department, and of the public—as far as the public ever can be satisfied. (Applause and laughter.)

Mr. MOIR said:

Before I perform the interesting duty which the staff of the London district has placed in my hands, I should like to express on their behalf our gratitude for the words of commendation which have fallen from the Postmaster-General and the Secretary. I sometimes think that Shakespeare—who knew this part of the country well—when he made Mark Antony say “The evil that men do lives after them, the good is oft interred with their bones,” was not thinking of telephone engineers;—(laughter)—because the evil which we do we hear of almost immediately, either in a violent letter addressed to the Secretary or the Postmaster-General, or an equally violent letter to the Press. The good that we do we don't hear very much about, except upon special occasions such as the opening of a new building. Then we receive, as we have received to-day, words of commendation, which, coming from the Heads of the Post Office will be, I am sure, most heartily appreciated by the staff. (Loud cheers.)

I should like to express our satisfaction at having so many visitors from the other side of the water, and notably an unexpected visitor in Mrs. Pease. (Applause.) I sometimes think that our good friends on the other side of the river rather sympathise with us. They think that we have been dumped down in a quarter that is rich in historical associations but in nothing else. (Laughter.) That is not quite true. We do not believe that. The Borough has many amenities which I am not going into just now. We have one great advantage in that the new building is near two of the great railway termini, and from the point of view of the staff that is a very great convenience, and was one amongst the many sound reasons which guided the Post Office in making up its mind to build this building here.

I should like to add that we greatly appreciate the convenience of having all the staff in one place. I believe that a house divided against itself has certain disadvantages, but there is no doubt at all that a large office with 200 of its employees in one place, and 150 in another place, separated three miles apart, is under disadvantages which can be readily imagined, and these disadvantages have been kept at a minimum only because the staff have worked well together and made free use of the telephone.

To-day's proceedings will put an end to the period of separation which has existed between the staffs at Denman Street and Wandsworth Common, and I regard the ceremony which the Postmaster-General is about to perform as something which will set the seal upon the union which is now, and will continue to be, I am sure, full of harmony and good will. (Cheers.)

And now, Sir, on behalf of the staff of the London district, I have pleasure in presenting to you a key, wherewith to open the new building. It has been designed by a draughtsman attached to my Head Office, and I should explain that the letters “L.E.D.” entwined on the head of the key, have nothing occult or mystic about them. They stand for “London Engineering District.” (Applause.)

The POSTMASTER-GENERAL said:

I thank you most warmly for your great kindness in inviting me here to-day to be present with you on this auspicious occasion, and for your great kindness in giving me a permanent memento of my visit here, and of to-day. I shall value this key more highly than words can express. I thank you from the bottom of my heart, and in declaring this building open I would wish that those in it may be blessed with good health and prosperity, and enjoy their work as far as it is possible under the conditions which prevail in the Post Office. (Applause.)

As far as I am concerned, whilst I am bound to take account of the interest of the taxpayer and also the interest of the public, my desire is to see that the conditions and remunerations of the staff are such as ought to exist in such a great Government Department as that over which I preside. I thank you all very much. (Loud cheers.)

DEATH OF MR. P. G. BURRELL.

WE deeply regret to record the death of Mr. P. G. Burrell, of the Secretary's office, who has been associated with telephone work during the principal part of his official career, almost, indeed, from the time when the State first undertook the supply of telephone service to the public. Mr. Burrell was in charge of the Telephone section of the Telegraphs before it was constituted a separate branch. He was only 58 years old.

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising { MR. JOHN LEE.
Committee - - { MR. J. W. WISSENDEN.
Managing Editor - MR. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

AUGUST, 1916.

[No. 23.]

THE POSTMASTER-GENERAL ON THE POST OFFICE ESTIMATES.

WE reprint in this issue the major part of the Postmaster-General's speech in the House of Commons on the Post Office Vote. He pays a warm tribute to the devotion of the staff both in carrying on the work of the Post Office with depleted numbers and in their wonderful response to the call for recruits. The total number of men (now over 60,000, we believe) who have joined the colours is very striking, the more so when we remember the indispensable character of the Department's work, and the urgent necessity for keeping the postal, telegraphic and telephonic services more than ever at their highest pitch of efficiency. The telephonists come in for their full meed of praise, and readers of the JOURNAL will appreciate how well it is deserved. They will also read with gratification the reference to the Sinn Fein rebellion. A good deal has been said about the supposed implication of large numbers of the Irish staff in the movement. The Postmaster-General's statement completely disposes of these rumours, and he has nothing but praise for the loyalty of that staff as a whole.

We think our readers will also be gratified to learn that the increased postal and other charges produced additional revenue of over a million instead of the estimated amount of £928,000, and that the telegraphs, despite the difficulties under which the service has been conducted, yielded an additional £200,000, although there was a reduction in traffic of about 25 per cent. We note that the threepenny London rate for telephone calls was not a success. This, perhaps, is not surprising. The charge was of course only tried as a war measure, but there are certain standard charges fixed in the public mind as the value of certain commodities

which, if exceeded, inevitably result in a reduced consumption of that commodity, especially when it is not a necessity of life. Such charges, we venture to think, are those of 1d. and 2d. for local telephone calls. A charge of 3d. at the purchasing value of money in this country places the telephone call along with the telegram as a means of communication only to be used in cases of urgency or by the well-to-do. Like holy matrimony it is "not lightly to be enterprised or taken in hand," and the would-be caller reflects before he parts with his threepence, whether the call is necessary or whether a letter would not save his turn. We see that the *Evening News*, after making the extraordinary discovery that the charge is not permanent, put forward a plea for penny calls in London. We are very doubtful if the present can be considered as the psychological moment for introducing so sweeping a change. It is easy to draw fallacious analogies between the penny call and the unremunerative Colonial penny post, but surely less abnormal conditions and a population engaged to the full in its usual avocations are necessary for success of such an experiment. The need for the telephone may, as the writer argues, be great at the present moment when there is a dearth of domestic servants and shop employees, but it is difficult to see how the use of the telephone, at a time when all social engagements are reduced, individual expenditure is limited in scope, and millions of men are withdrawn from their customary pursuits, is going to be sufficiently increased to recoup the Department for reducing its normal call fees by one-half.

It will be seen that the telephones produced an additional £115,000, as against the estimated figure of £205,000. This difference has been amusingly converted in one newspaper to an actual loss of £115,000 and in another of £110,000! Our critics do not seem to be aware that rates have been raised both in Germany and Austria; at least the *Evening News* refers to the pre-war unlimited rate in Berlin. Stockholm, which to the telephone critic is as King Charles's head was to Mr. Dick, is cited once more. But that happy city is enjoying both the blessings of neutrality and unremunerative telephone competition. We, on the other hand, have to practise economy and minister to the military needs of a nation at war. Our friendly rivalry with Stockholm, Los Angeles and Spokane and the other darlings of our critics must be postponed until a more convenient season.

HIC ET UBIQUE.

WE are very glad to give publicity to our correspondent J. J. T.'s remarks on the abandonment of the Antwerp Central Telegraph Office. We understand that he had to receive quite a deputation of Belgian *confreres* protesting against the suggestion that the Antwerp office was not as thoroughly disorganised as was possible in the circumstances before being abandoned to the Germans. Our readers will doubtless have appreciated that the article we published last month made no pretence to be anything but a presentation of the German version of their administration of Belgian telegraphs.

A CORRESPONDENT, Mr. W. Reginald Bray, who styles himself the Autograph King, writes to impress upon us that the somewhat nonsensical "longest sixpenny telegram" which we reprinted

in an odd corner of the last issue, has no title to that honour, which he claims for himself with the following :—

“Bray, Devonshire Road, Forest Hill.

Llanfairpwllgwyngyllgogerychwyrndrobwl - Llandisiliogogoch
Sutton-under-the-Whitstone-Cliff Ruyton-of-the-Eleven-Towns
Willoughby-on-the-Wolds Llanarman-Dyffryn-Ceiriog.

Pontrhydfendigaid Newtownmount-Kennedy.”

Had he been able to lengthen the address, he tells us, the message which contains 216 letters would have run into nearly 300. We do not know that it is more coherent or informative than the specimen we published, but it is certainly longer.

“I HAD just finished breakfast and was filling my pipe when I got Bullivant's telegram. It was at Furling, the big country house in Hampshire. . . . I flung him the flimsy with the blue strip pasted down on it and he whistled.” Mr. John Buchan engaged, one supposes, on his new serial for *Land and Water* as a sort of relaxation from the work of compiling *Nelson's History of the War* (war price 1s. 3d.) opens to “Greenmantle” with the quotation above.

We are professionally interested in the manner of receiving that “flimsy with the blue strip pasted down on it.” Was it too late overnight and received by post? or had the systematic Wheatstone displaced the A.B.C. that erstwhile carried the village traffic? Perhaps it was a confirmation copy or some sleepy surveyor had failed to report on his overdue conversion-scheme. Whatever it was “he whistled,” and a Sherlock Holmes might suggest that he did so because it demonstrated that Bullivant was not short of ninepence.

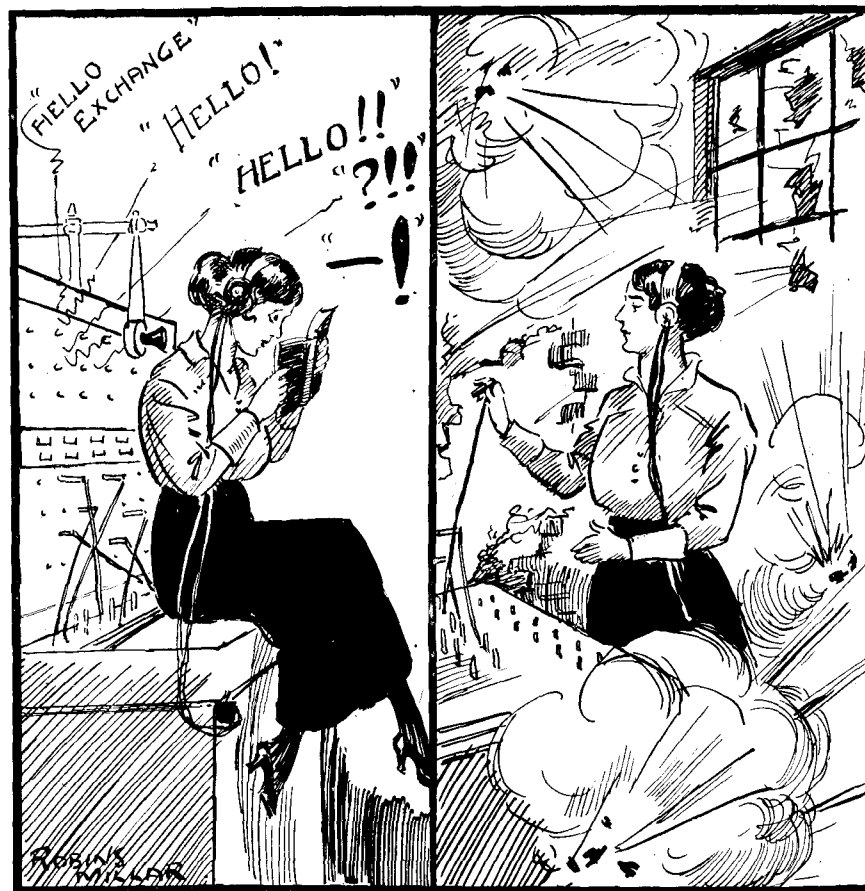
THE following paragraph from the *Telephone Engineer*, Chicago, of June 1916, throws some light on the statement to which we referred in our June issue, that the American Government had arranged to “take over” and operate all telegraphs and telephones in the United States for three days.

“Exclusive control of all toll lines of the American Telephone and Telegraph Company was given over to the United States Government at 1.30 p.m., May 5, for three days. The action followed an advance announcement from Washington D.C. Army posts, naval bases and shipyards throughout the entire United States were in direct communication with each other. The move was a part of a preparedness campaign which the War Department recently inaugurated. The toll lines for commercial use continued in operation while the Government was making the telephone tests. That the United States navy has at its disposal exceptional means of quick communication in case of war was shown during the period, when both wire and wireless telephone apparatus of the American Telephone and Telegraph Company were successfully used to mobilise the naval forces throughout the country and to communicate from shore with the battleship *New Hampshire* at sea. Not a hitch occurred during the demonstrations. Perfect communication was established between sixteen of the Government's naval stations on the four borders of the country and the Navy Department at Washington, while the wireless telephoning to and from the *New Hampshire*, which was cruising off the southern drill grounds, was a complete success.”

A HORNSEY paper, *apropos* of emigration to Saskatchewan, says :—

When we learn the use that is made of the telephone in new countries, the less we can understand the ineffable stupidity of the British Government in allowing themselves to be not only advised on the subject, but actually led, by the Post Office authorities, by hide-bound officials who considered the safeguarding of their own department as of greater importance than the introduction of a better system of communication. Here, in highly civilised England, the telephone is still regarded as the luxury of the well-to-do; in distant Saskatchewan we find it on the little farm of 160 acres, where among the sounds of the night are the grunting of the bear and the howl of the coyote.

It does not occur to the writer that it is precisely because the little farm is situated amongst the bears and coyotes, because there are probably no telegraphs, no deliveries of letters or other



[By the courtesy of the *Glasgow Evening News*

THEN AND NOW.

The first of the above pictures exhibits one of the most tenacious beliefs of the humorous; the other illustrates incidentally the Postmaster-General's remarks on page 206.

conveniences of civilisation that the farmer so eagerly subscribes to the telephone system, whatever the cost. We are not denying that rates in Saskatchewan are reasonable; but it is difficult to persuade the small farmer in this country to pay the additional mileage rate required to extend a telephone line to his farm, for the simple reason that his necessity is not so pressing. But our critic thinks otherwise :—

When you find a telephone
In a farm aloof and lone

In the wildest West,
Where its shrill insistent bell
Mingles with the coyote's yell,
What does it suggest?

When the British mole or stoat
Can emit its plaintive note

Like the very deuce,
While no telephonic bell
Tintinnabulates as well,

What is our excuse?

In my ruminative mind
Springs a lesson well-defined:

If where mournful coyotes howl,
Plantigrades and suchlike growl,

Telephones abound,
While the weasel at our doors
Fills the air with nightly roars

Where no 'phone is found,
Surely everyone must know
'Tis alone because our O-
fficials are hide-bound.

W. H. G.

TELEGRAPHIC MEMORABILIA.

ONE has an ever-recurring difficulty in dealing with certain types of persons who apparently do not grasp the rock-bottom principles which govern the working speed of a telegraph line.

Even inventors of telegraph apparatus have been known to come to grief on this same difficulty, although for the most part these have generally had something more than a nodding acquaintance with the practical side of telegraphy. Notwithstanding this knowledge it is however at this point that many an inventor's aims have been misunderstood. As a consequence many virtues attributed to the child of his brain have failed to give evidence of their existence, virtues let it be said which, frequently, have too often been conjured up by some over-sympathetic protector and foster-parent.

These good folk appear to estimate that in order to increase the output of a line all that has to be done is to fit the latter with some new type of telegraph apparatus and, hey presto!—the deed is done!

The existence of the K R law, the code used, the type of traffic dealt with, all are, apparently, to be ignored by this or that "latest," which is expected to devour the traffic with the regular avidity of a Hoe printing machine.

They have seen in the laboratory and workshop really and truly wonderful combinations of wheels and levers which turned out infallible copies of:—

"Allons enfants de la patrie. . . ."

"An Austrian Army awfully arrayed. . . ."

"Pack my box with five dozen liquor jugs,"

and any number of "quick brown foxes jumping over lazy dogs," but that a telegraph line should make any difference to the rate at which the handle should be turned does not to them appeal as a reasonable proposition! Neither does the fact that there are even differences in the nature and quality of telegraph lines! Of such an one we may say (with apologies to Wordsworth):—

"A line upon the railway's brim
Was but a telegraph to him
And it was nothing more."

No wonder then that these same people are surprised to learn that even machinery and the very metal itself becomes "tired," that at times crank, and pin, and shaft, and lever, and ratchet become weary and need rest, and at times take unto themselves something of human crotchetyness and need almost as much corresponding coaxing.

Is this foolishness? Let those alone who have had long and practical experience of any modern printing telegraph system answer this question—after a "bad" day!

The Creed printer is probably one of the most, if not the most robust of high speed telegraph type-printers, and because of its very stability one has heard surprise expressed that even minor defects should have developed after 24 hours running at nearly top speed. There may be times when top notch may be needed, and the apparatus be coaxed into bearing the strain. A mail boat having been chased by an enemy submarine may arrive safely in port with funnels red hot yet with engines undamaged. Neither of these could however be cited as an argument for the policy of permanently "working on the limit."

There be others to whom the *type* of traffic dealt with is scarcely worthy of consideration as a factor. To these there is no difference between the simple social message of *meet you to-morrow*, and the many varieties which range upwards to Stock Exchange quotations, prices and Government figure and letter cipher, in literally thousands of groups.

The value of the human element in dealing with modern high-speed telegraphy is yet another factor, by no means the least important, and one which has yet to be realised to the full in this country. In the United States they appear to have recognised

this from the first and to have concentrated the necessary interest upon it in order to do justice to apparatus and line.

Mention has been made of the code used as a factor in the working of a telegraph line. This point also is of no minor importance, especially when viewed in relation to the type of traffic. The most economical code for land lines generally is, of course, the Baudot or any form of the five-unit letter code which as compared with the Morse, works out in the advantageous proportion of 5 : 8. With these codes the *average* is also the *maximum* and the *minimum*, and therefore the same for all classes of traffic, *i.e.*, figures or letters. In the case of figure traffic where unabbreviated Morse is compulsorily used, as in Creed working, the average unit length per figure overtops the average unit length per letter by nearly 45 per cent., the average unit length per symbol for Morse figures running up to between eleven and twelve units.

It is then not difficult to realise how considerable is the effect of the *type* of traffic combined with the type of code used, upon the speed of any given circuit.

There yet remains the cable code for consideration, which, as mentioned by Mr. Judd of the Eastern Telegraph Company, works out at an average unit length per letter for figures and letters combined, of about 3.7. For figures only, the average is the same as the Baudot.

A curious effect is therefore produced and certain advantages of an electrically speaking, quicker land line are considerably discounted when worked by Morse code at, say, 75 to 80 words per minute, and combined with, for example, a long submarine cable, working by the cable code at 35 words per minute. For in the case of the social or Press telegram, the land line will in actual practice work out at approximately its best theoretical value, slightly slower in mixed commercial work (figures and letters) but, in figure cypher at the very heavy reduction of about 45 per cent.

Thus when dealing with purely figure traffic over a combination as above of land line and cable, owing simply to the differing average time values of both code and traffic, the *actual* speed of the land line will in certain cases so far drop as to all but lag behind the cable itself.

The Post Office Telephone and Telegraph Society, one is glad to hear, though esteemed by some to hibernate in the summer (pardon the Hibernianism!) is by no means dormant even in the dog days. One hears of the doings of its committee, and something of its plans for the coming 1916-17 session. The program is naturally not yet fixed up but sufficient advance has been made to enable it to be stated that an interesting bill of fare is in course of preparation. The success of the short paper evening of last session will doubtless be reflected, probably on more than one occasion, in the forthcoming list of lectures. One or two matters of intense interest to the staff of the telegraph side are likely to come under review and discussion, and—well—that is all, for the present.

Here and there members of the Telegraph, Foreign Section, appear to have assiduously devoted themselves to the study of the Russian language. Says one, "the alphabet is perhaps forbidding in appearance, the more so when it is discovered that there are ten more letters than in English. The block characters are perhaps forbidding to a prejudiced Britisher and the *cursive*—are distinctly so!" Nevertheless this "recreation" cannot but prove profitable if needing no small amount of pluck. Was it not said of a famous statesman that he spoke French "with courage"?

It has been said elsewhere that it is incorrect to speak of the "Baudot" code which code was only adopted, not invented, by Baudot. Gauss it is alleged was the actual originator of the five-unit arrangement. Perhaps indeed the term "five-unit code" would be preferable as the more accurate description, leaving to men of finer judgment the settlement of an apparently international question. In any case it was Baudot who absolutely proved its economy and utility and practically applied it, but there, a code by any other name would work as well.

The article on "The Ratio Between Work and Wages" in the

last issue has aroused the keenest of interest amongst telegraphists and the well-wishers of their craft. While for the moment, refraining from entering upon a discussion of the many interesting questions raised by the writer of the leader, there are yet two points which strike one regarding the arguments therein set forth.

"Payment by results" as a basis for Government grants for education was abandoned because of its disastrous effects alike to teachers and scholars, *i.e.* to producer and consumer.

Then as regards the penny bun man who is sufficiently energetic to make most buns. Here again it is arguable that the man who makes *most* buns does not of necessity make the *best* buns. Personally on the rare occasions when I indulge in the gastronomic pleasures of my youth, I prefer the *good* bun, just as on those almost equally rare occasions when I receive a telegram I prefer the correctly rendered telegram to the other description. In fact as a member of the public it interests me very little that 100 buns or telegrams are turned out per man per hour, if I cannot digest one or read the other.

The old cable ship *Hooper*, now known as the *Silvertown*, is at present in dry dock in a Welsh port. This old vessel, which has evidently not yet seen its last days, was at one time utilised for cable-laying in Eastern waters. On these occasions the late Lord Kelvin, when yet Mr. William Thompson, acted as telegraph expert, a fact which will doubtless have its attendant interest until the day when the poor old hulk is sold for final dissolution.

An interesting item in connexion with the possibilities of submarine cable manufacture and laying may be found in the account of two *power* cables which have recently been laid in the bay of San Francisco. The depth of water was excessive in places, the strength and variety of the under-currents added to the difficulties of successfully placing the cable, while the busy traffic itself impeded the process. Nevertheless the 5,000 yards were laid and accurately positioned, the electrical value of the cable not being impaired in the slightest as was evident from the test pressure of 22,000 volts which it successfully withstood.

In case of misconceptions which may have arisen from the report published in the July number on "Telegraphs and Telephones in Belgium under German Administration," perhaps it may be permissible to modify certain impressions which the *Blätter für Post und Telegraphie* has certainly conveyed to its readers here and on the Continent.

The article would appear to have implied that the Belgian officials who remained in Antwerp did not so effectually bar the way to a rapid restoration of telegraphic and telephonic communication as did their comrades of the capital city. In Brussels the C.T.O. was so "devastated" says the German report, that a temporary office had to be equipped before communication could be restored. In the case of Antwerp, although possession of the C.T.O. was not taken up until two days after the fall of the fortress, it is alleged that the lines, connexions and apparatus were so little damaged that, so we are led to infer, only a short time elapsed before all was in working order.

It should perhaps be explained that as related in the December number of the P.O. TELEGRAPH AND TELEPHONE JOURNAL, 1914, although the fortress may have fallen two days prior to the actual capture of the Antwerp C.T.O., it was the primary duty of the small volunteer telegraph staff left behind to *maintain* communication with certain points up to the last possible moment. This they gallantly did, but they were but a small band, and although certain steps were taken to render most of the apparatus left behind unusable, it was not possible to act with such comparative leisure and completeness under shot and shell fire as would naturally have been the case in a city whose equal duty it was to open its gates to the temporary conqueror. One is well aware that certain telegraph officials of the Brussels office were actually maltreated because of its condition, and more perhaps because when asked to show where the English submarine cable was connected they replied that it did not land there—*C'est la vérité vraie, monsieur!*—but "devastated" was probably used by the Teutonic editor in much the same way as other "fire and fury" scribes have on occasion misused their own mother tongue for the sake of effect.

J. J. T.

NEW YORK TELEPHONE SOCIETY.

WE are indebted to the Managing Director of the Western Electric Company for the following interesting account by one of the company's engineers of a dinner of the New York Telephone Society:—

May 23, 1916.

I had the pleasure of attending a large dinner of the New York Telephone Society last Friday, and I am sure you will be interested to hear what happened.

It was proposed to give the employees of the American Telephone and Telegraph Co., the New York Telephone Co. and the Western Electric Co. an opportunity to see something of the progress made by the companies recently in extending the practical commercial range and application of the telephone, both wire and wireless.

For the purpose the large hall of the 71st Regiment Armory had been engaged and prepared for a banquet. About 50 tables were set and covers laid for 3,000 persons. At each place was also located a watch telephone. I might say incidentally that I am told that this was the largest number of diners ever gathered for a regular banquet in the history of the distribution of hot food.

The speakers of the evening sat on a raised platform at one end of the enormous hall. Among the speakers were Mr. Vail, President of the American Telephone and Telegraph Co., Mr. Bethel, President of the New York Telephone Co., Mr. Halligan, Vice-President of the Western Electric Co., and Mr. Carty, who was the chief speaker of the evening. In making their addresses these gentlemen spoke into regular telephone desk sets placed before them. In this way every one of the 3,000 persons present, even those in the most remote corners, heard perfectly. This exhibition in itself was interesting in indicating the possibility in the future of making the words of a speaker perfectly plain to very large gatherings, where to-day those far away understand only a small percentage of the speech. The subjects were illustrated by cinematographic pictures thrown on a screen.

The 3,000 telephones were then connected over toll lines with telephones in Philadelphia and Baltimore. In each of these cities there are telephone societies whose members had gathered at a dinner and each of whom, as in New York, was given a watch receiver. Greetings were exchanged between the speakers in the three cities and I am sure that the 1,000 persons listening in each of the other two cities heard as well as did the 3,000 in New York.

Mr. Carty next gave an explanation of the wireless telephone. The 3,000 telephones were connected by wire lines to the wireless installation on the building of the Western Electric Co. From there the transmission was by wireless to the Government wireless installation at Arlington, Virginia. From there the telephone currents were transmitted by wire to the home of a naval officer who lived in Washington. A conversation was carried on between Mr. Carty and the naval officer, in which the transmission was as satisfactory as over wire lines. One could not detect any distortion, and I am told by those who knew the officer that his voice sounded normal and was recognisable. We heard of course a certain amount of atmospheric static discharge but not enough to interfere with the conversation in any way.

Mr. Carty then proposed to give us an opportunity to listen to some real long-distance wire transmission. In order to illustrate more thoroughly what was going on, a large map of the United States had been hung on the wall, on which the various telephone lines talked over were shown by rows of small incandescent switch-board lamps, whereas the large switching centres were marked by larger coloured lamps.

Mr. Carty connected the 3,000 telephones to his own instrument so that we were able to listen-in on the conversation, and then called up successively the various wire chiefs who in each case had assisted in establishing the connexion.

First he connected the lines through Boston to a town in Maine, which is in the north-east of the country. Next his telephone was connected over Philadelphia, Washington and Atlanta to a town in

Florida, which is the most southerly State in the Union. After this the telephones were connected over the important towns on the route to a border town in New Mexico, in the far south-west. Then the telephones were connected straight across the continent to Seattle, in the State of Washington, which is in the extreme north-west corner of the country. And finally the telephones were connected to San Francisco, the line passing over Philadelphia, Chicago, Omaha, Denver, Salt Lake City and then San Francisco.

It was very impressive to watch the lines of lights going across the map of the continent and to hear one wire chief after another answering with scarcely a noticeable loss in transmission.

What was particularly interesting—not only were we 3,000 in New York listening-in on the line, but the 1,000 telephones in Baltimore, also the 1,000 telephones in Philadelphia were connected to the circuit and heard as well as we did.

In San Francisco there was also a gathering of over 1,000 persons provided with watch telephones, who listened to the conversation which was carried on between the speakers at both ends. Addresses were made alternately in New York, Philadelphia, Baltimore and San Francisco. Songs were sung at all four points, orchestral music was produced, and finally we were all connected to a transmitter on the Pacific Coast which gave us the roar of the Pacific Ocean.

I sat within a few feet of the speakers in New York. They spoke, without exception, in a normal voice. I had personally no difficulty in understanding what was said in San Francisco, nor did the other 2,999 in the hall. The conversation seemed to me about as loud as it would be between two common battery instruments speaking over perhaps fifteen or twenty miles of No. 19 B. & S. gauge cable.

I have often heard of this trans-continental transmission over a line 3,400 miles long, but I did not realise until this evening what a vast undertaking it was, involving a remarkable combination of engineering investigation and research, of every difficult and costly line construction, of the faultless co-operation of the highly trained staff of employees who connected, supervised and maintained these circuits, and underlying all, of the commercial enthusiasm and enterprise of the companies who planned and financed the whole undertaking.

It is real inspiring to be associated with companies whose men could undertake and carry through such a magnificent piece of work.

TELEGRAPH AND TELEPHONE WORK IN A PROVINCIAL DEPOT.

By J. M. RUSK (*Officer-in-Charge, Edinburgh Depot, Post Office Stores Department*).

(*Concluded from page 203*).

WHEN stores are urgently required it is often necessary to send substitutes and now and then this is done inadvertently. One night a large consignment was being hastily despatched. Two lorries had left and the third was impatiently waiting for its load. The storeman in charge was reading off the items from the requisition as they were placed in the lorry, but when he came to 200 yards P.C. cable 2/12½, instead of the usual "Aye," the porter replied in a frightened voice, "My goodness, I've cut aff 2/10." The checking officer, a Scot of placid temperament and blameless vocabulary, was however evidently suffering from the excitement, for he startled his colleagues by angrily retorting, "Send on sanguinary stuff sae lang as it's cable."

Lest, however, I should be tempted to further confessions, we shall now turn to consider the clerical work in connexion with engineering issues.

The daily cover with the executed requisitions enclosed is, as we have seen, passed from the transport duty to the office where the requisitions are signed for. They are at once handed to a boy clerk who prepares for each consignment a delivery note in quadruplicate form. The A copy is retained in the depot, the B copy goes to the consignee, and the C and D copies are sent to the Superintending Engineer who returns the former to the depot as an acknowledgment of receipt and retains the latter for accounting purposes. When the delivery notes have been issued and checked, the requisitions are passed to the ledger clerk who posts the quantities to the ledger cards. Delivery notes are priced at rate-book value and the number and value of each is recorded on a cross-check list proper to the district concerned.

The Superintending Engineer also prepares a cross-check list of his receipts, and at the end of each month these lists are sent to the Accountant-General's Department, where they are associated and compared with each other and with the total value of stores passed through the Engineers' Accounts. Thus, the issues from each depot to every district and the receipts in each district from the various depots are reconciled monthly. Stores issued from contractors are dealt with similarly, the contractors' works being virtually treated as an issuing depot. Items transferred from one depot to another, being transactions within the Stores Department, are, however, advised on unpriced triplicate delivery notes and are not covered by the cross-check.

Stores are also issued under an exchange system devised to obviate accounting entries in the engineering districts. If a piece of apparatus becomes faulty, the engineer applies for a substitute on a "maintenance exchange" requisition in duplicate form. A new instrument is at once despatched, advised on one copy of the requisition, and the duplicate copy is filed in the depot until the faulty instrument is returned in exchange. No book entries are made and the depot stock is not affected in value since the old or repairable instrument is taken on charge at its value as new. Old instruments are repaired in the factories and returned to stock as new, the cost of repairs being charged to maintenance repairs.

Let us now turn again to the store and examine the other section of engineering work, viz., that dealing with returned stores. When an engineer is dismantling a line, he sends all saleable recovered stores to the nearest depot and advises them on quadruplicate delivery notes, which are recorded on his cross-check lists and follow practically the inverse routine of the issue vouchers. Two copies of each delivery note for recovered stores reach the depot, one of which is retained and the other used as an acknowledgment; so that in the store there is always a batch of these delivery notes awaiting the arrival of the stores. The work is troublesome and uncongenial. Stores returned are generally in a dirty condition, it is difficult to reconcile the items advised with the stores received, descriptions are not always standard, and disputes arise, because an engineer's conception of the condition of stores naturally depends on whether he is the sender or the receiver. The stores have first of all to be sorted into three classes—good, repairable and scrap. Stores fit for re-issue are straightway put to stock, and repairable stores are laid aside for treatment either in the depot or in the factories. In the depot, insulators are washed and such articles as bolts are oiled and have the screws run down, and so on. Scrap stores, in order to obtain the best prices, have to be very carefully sorted for sale. The Stores Department sells scrap engineering stores to the annual value of £100,000. The material consists mostly of copper, bronze and iron wire, brass, lead, zinc, and india-rubber cables, and you will readily understand that dealers in old metals must not be given galvanised iron wire in a consignment of copper. The sorting, handling and recording of this material bulk largely in the work of every depot; and as many of the instruments are of obsolete patterns which are troublesome to describe, and have little value other than historical, recovered apparatus presents peculiar difficulties. Then, differences in the weights of consignments may occur, because engineers have not the facilities for accurate weighing, when they are recovering material in a remote district, and they are generally anxious to part with the stores quickly in order to save rental charges and the risk of loss.

These difficulties, combined with the condition of this scrap material, have made the returned stores duty a most unpopular one in the store. The work is referred to as "D/Notes," because the storemen are given a batch of delivery notes and have to find each consignment, unpack the stores, sort them out, weigh the different items and have all discrepancies checked. An illustration of the unpopularity of this duty occurred during the retreat from Mons. Two storemen in different Scottish regiments accidentally met during a somewhat exciting moment in the famous retreat. One of them was lying in a hastily prepared trench and, while the other regiment passed over, he recognised a colleague on the returned stores duty. With a wave of recognition he shouted, "This is worse than D/Notes, Sandy," and it is reported that Sandy hesitated before assenting, and hurried on.

When the delivery notes for recovered stores have been dealt with, they are placed in a "received cover" and sent to the office at the close of the day. There they are revalued as the result of the amendments made, and the copies prepared for return to the Superintending Engineer. If the differences in value are small, they are ignored; in certain cases the depreciation is passed through the depot's cost statement; and in others the differences are entered on a monthly schedule which is sent to the Superintending Engineer, so that he may adjust his accounts in one operation at the end of each month. The delivery notes are then passed to the ledger clerk who posts from them to his ledger cards the receipts taken into stock.

When a sale of scrap material is arranged, the stocks are lotted up and the lots are included in a general list for the whole Department, upon which tenders for purchase are invited.

Before leaving the details of the Engineering section let me say a few words about stock replenishment. As already stated, demands are spasmodic and the stock return system applied to postal stores does not therefore meet the needs of the Engineering section. Instead of waiting for a periodical scrutiny of the stocks, it is necessary to take steps to replenish as soon as the minimum stock is reached. Whenever an issue of engineering stores is taken from the minimum stock, the item is immediately reported to the office by means of a "wants slip" or by a record in a low stock book and steps are at once taken to obtain further supplies.

As an additional safeguard the minimum stock appears on each ledger card, and as running balances are kept on the cards, receipts being added and issues deducted, the posting clerk is always aware of the exact stock position and directs attention to every item in need of replenishment. This system proved very effective during the early days of the war when the

Gell Telegraphic Appliances Syndicate, Limited.

ON WAR OFFICE, ADMIRALTY, POST OFFICE, CROWN
AGENTS, AND OTHER COLONIAL ADMINISTRATIONS
LISTS OF CONTRACTORS.

SOLE MANUFACTURERS OF THE

GELL KEYBOARD PERFORATOR.

GELL Motor - Driven Transmitter.

GELL Motor - Driven Receiver

for Morse and Cable Wheatstone working.

Also Manufacturers of

**LANDLINE, CABLE AND WIRELESS
TELEGRAPHIC APPARATUS.**

Registered Offices:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Sardinia House, Sardinia Street, Kingsway, W.C.
Telephone: Holborn 6826.

Works:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Pine Grove Works, Tollington Park, London, N.
Telephone: North 1196. Telegrams: "Gelltas, London."

EBONITE.

TONS of **SHEET, ROD and TUBING** in London
Stock in various Qualities and numerous Sizes.

EBONITE-VULCANITE owing to its special nature,
can only be made **successfully** after many years of experience.

We have been manufacturing this Material for
OVER 60 YEARS.

AMERICAN HARD RUBBER CO.,

13a, FORE STREET, LONDON, E.C.

"FRONISETH, LONDON."

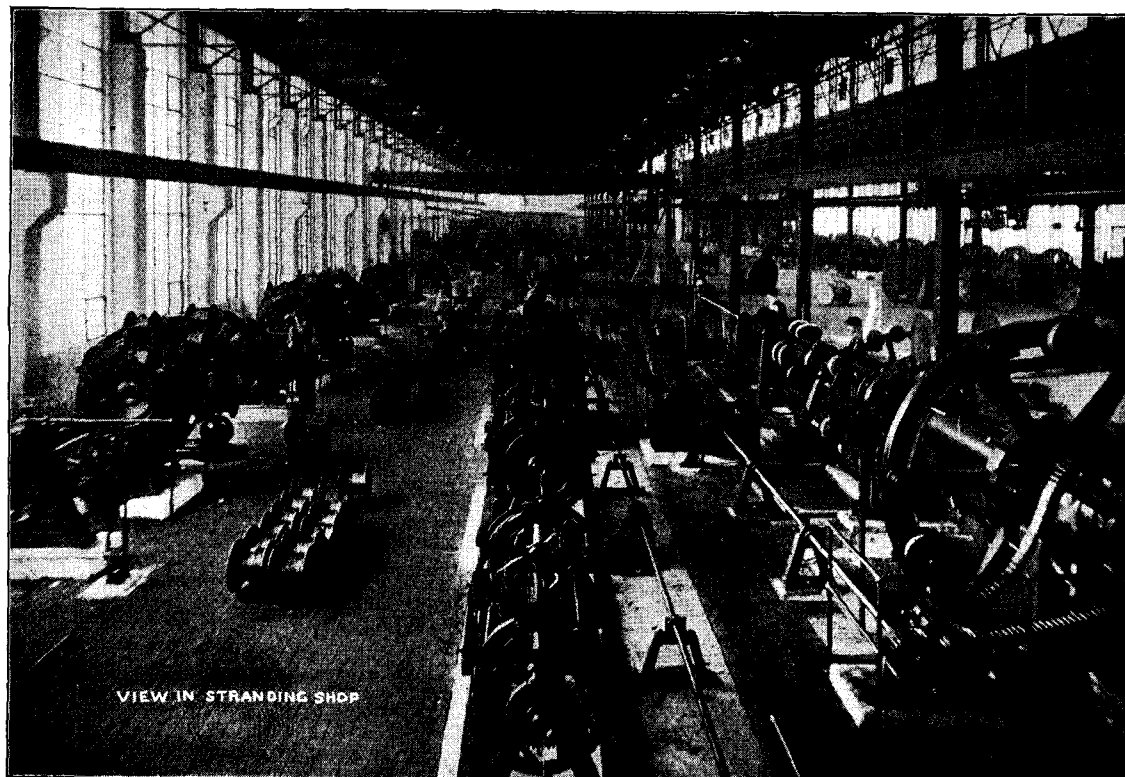
Head Office: 9 13, MERCER STREET, NEW YORK, U.S.A. CENTRAL 12754

Factories: Akron, Ohio. Butler, New Jersey. College Point, New York.

Silk and Cotton-Covered H.C. Copper Wire,
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
13259 CENTRAL.
"ORMISTON, LONDON."

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital).

Telephone: 1309 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3s. 6d. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

	PER PAIR
Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses	3 6
Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames	7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE, WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

Important New Book.

Automatic Telephony

A Comprehensive Treatise on Automatic and Semi-Automatic Systems

By ARTHUR BESSEY SMITH, E.E.

Member A.I.E.E., formerly Professor of Telephone Engineering, Purdue University,

AND

WILSON LEE CAMPBELL, E.E.

Fellow A.I.E.E.

406 pages, 6 x 9, illustrated

17s. net, postpaid

See our Advertisement, January issue, page 1Y.

CONTENTS.

CHAPTER	CHAPTER
I.—Trunking.	IX.—Automatic District Stations.
II.—Automatic Electric Company's Switchboard Apparatus.	X.—Clement Automanual System.
III.—Subscribers' Station Equipment for Use with Automatic Electric Company's Two-Wire Systems.	XI.—The System of the Western Electric Co.
IV.—Measured Service Equipment.	XII.—Long Distance, Suburban and Rural Line Equipment.
V.—Automatic System of the American Automatic Telephone Co.	XIII.—Cutovers and Interconnections of Manual and Automatic Offices.
VI.—Siemens and Halske System.	XIV.—Power Plant, Supervisory and Testing Equipment, and Circuits.
VII.—The Lormer System.	XV.—Traffic.
VIII.—Automatic Traffic Distributor Equipment.	XVI.—Development Studies.

HILL PUBLISHING CO., LTD.,

6 & 8, BOUVERIE STREET, LONDON, E.C.

Now Ready.

AGAIN ENLARGED

Price 3/6 net.

Postage (United Kingdom, 6d. extra. (Abroad) 1s. 4d. "

The Year Book of Wireless Telegraphy and Telephony, 1916

(FOURTH YEAR.)

1,000 pages. Numerous Illustrations. Cloth, Demy 8vo.

CONTENTS:

The Wireless Telegraph Laws and Regulations throughout the World.
Complete List of Land and Ship Stations with Call Letters, Wave Lengths and Hours of Service.
International Time Signal Regulations.
Special Articles by Leading Experts.
Map of Wireless Stations of World (Revised 1916). etc., etc., etc.

"The only reference work on the subject."

THE WIRELESS PRESS, LIMITED,
MARCONI HOUSE, STRAND, LONDON, W.C.

STANDARD TECHNICAL WORKS

AUTOMATIC TELEPHONY. An excellent description of the Strowger Automatic System as adopted by the G.P.O. By S. TURNER, E.-in-C.'s Office. 32 pp., illustrated. 7d. net, post free.

TELEPHONE TROUBLES, AND HOW TO FIND THEM. On both the Magneto and C.B. Systems. Sixteenth Edition. 7d. net, post free.

THE TELEGRAPHISTS' AND TELEPHONISTS' NOTE BOOK. Third Edn. Highly spoken of by leading P.O. officials. 1s. 7d. post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY. FINAL EXAMS., 1906-15. By H. P. FEW, Silver Medallist. An invaluable work, recommended by the leading technical journals. Limp Cloth, 8vo., 1s. 8d. net, post free.

THE TELEGRAPHISTS' GUIDE. By BELL and WILSON. The best work of its kind. For teachers and students alike it is invaluable, and the repeated calls for fresh editions prove its merit. Sixteenth thousand. 2s. net, or 2s. 3d. post free.

TECHNICAL TELEGRAPHY. By ROBERTS and BURROWS. Fifth Edition. Contains an exhaustive selection of questions and model answers in all grades of the C. and G. exams. 2s. net, 2s. 2d. post free.

THE TELEGRAPHIST'S TECHNICAL VADE-MECUM. Being Notes for Students preparing for the C. & G. Grade I. Exam. in Telegraphy and Telephony. By F. TERREY, Honoursman. 8vo, 80 pp., 2s. 2d. net, post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY. By H. P. FEW. Includes model solutions to the C. and G. exams. 1904-1914, as well as to several typical questions set at the Post Office Departmental exams. for Overseerships. Fourth edition. Cloth. 230 pages, 172 illustrations. 2s. 6d. net, or 2s. 9d. post free.

NOTES ON TELEGRAPHY. By G. MOGG. A simple exposition of the rudiments of technical telegraphy and telephony. Specially designed to meet the requirements of the C. and G. Ordinary Examinations. 2s. 6d. net, or 2s. 9d. post free.

A B C OF THE TELEPHONE. A Practical Treatise for all who are interested in the subject. Treats on the theory, practice, construction, care, and management of Telephones and their appliances. Cr. 8vo, 349 pages, 267 illustrations. Handsomely bound, 4s. 6d. net, post free.

Sent post free at prices stated by

S. RENTELL & CO. Ltd., 36, Maiden Lane, Strand, London.
WRITE FOR CATALOGUE NO. 36.

Edinburgh depot was suddenly called upon to meet abnormal and urgent demands from its comparatively small stocks. To have requisitioned large supplies at the expense of other depots, would have embarrassed our colleagues in Birmingham or London and perhaps have hampered engineering works in England, and we were confronted with the problem of meeting the emergency from day to day without allowing surpluses to accumulate. Immediately the pressure began the ledger posting was brought close up to date and for months it was never allowed to fall a day behind. Issues were carefully watched to ascertain the trend of the work and stocks were requisitioned as required. The clerk on night duty sat with the ledger card cabinet beside him, and was in a position to answer in a moment every enquiry as to stocks held or substitutes available. Whenever an abnormal issue had to be made, a replenishment supply was ordered and if necessary part deliveries were obtained by passenger train. Frequently within a few hours of the receipt of a consignment issues had to be made from it, yet I cannot recollect a single case of exhausted stock of an item proper to be held at Edinburgh.

The nearest approach to it occurred with a certain telephone which suddenly sprang into notoriety. Demands for the item arrived almost hourly, stocks were depleted and replenished every day or two, and substitutes were refused. A wire for 100 to replenish stock was answered by a telegram stating that 50 had been sent, a very significant sign of shortage. In the days of peace these instruments were obtained from Birmingham by canal and steamer *via* Liverpool and Leith, and as luck would have it, a large supply was on the way. We decided to make an effort to intercept the consignment, but was it on the canal or buried somewhere on the congested docks at Liverpool, or on a steamer rounding Cape Wrath, or worse still, had it been remembered and captured by some of our enterprising colleagues at Birmingham? By a trunk call we got into touch with the shippers at Liverpool, and a clerk, after expressing surprise at the audacity of our demand, agreed to make an effort to find the cases described. In a comparatively short time he discovered them on the docks and the consignment reached Edinburgh by the next passenger train. From this and many such instances of good fortune I think that one of the cherubs "who sit up aloft" must have been detailed for special duty on naval circuits during those fateful weeks.

We have now covered the office and depot routine of engineering stores procedure, and although I have not been able to give you more than the merest outline of the system, perhaps it will suffice for our purpose here.

There is, however, an important function of the Stores Department, viz., transportation, which deserves special reference since it causes depot officers considerable anxiety, although it also gives opportunities for initiative and resourcefulness. The engineer submits his requisition stating the time and place of delivery, and it is the duty of the Stores Department to provide and deliver the stores. For reasons already mentioned it is frequently of the utmost importance that stores should be delivered to time, otherwise gangs may be kept waiting and the Superintending Engineer's plan of work seriously disturbed. It is not a difficult matter to despatch stores at short notice from a depot, but, when consignments have to be drawn from other distant depots or from contractors' works, much careful organising is necessary to arrange for their speedy transit and shipment. It is one thing to get a consignment to Edinburgh or Leith but quite another to have the consignment delivered at the ship's side in time for sailing. Elaborate arrangements have to be made with railway companies and with the shipowners who must be given no peace until the stores are actually on board. This work can best be illustrated by describing a few recent instances. You will understand, of course, that exceptional measures are not adopted until we are quite satisfied that they are really justified, and as the following cases occurred in connexion with the war crisis, you will not expect me to give details of the destinations.

One day we were warned that a very heavy demand for stores was being prepared and that it might be essential for the consignment to be shipped by the steamer leaving Leith two days later. Negotiations proceeded throughout the day as the details reached the Superintending Engineer, but it was midnight before the first list of stores could be wired on to the other depots with instructions to pack their items. At ten o'clock next morning the Superintending Engineer had his local arrangements sufficiently advanced to inform us that the consignment must be despatched by the boat leaving on the following day at 4 p.m. He was able to detail all the stores except wire and the instruments, the latter being requisitioned a few hours later, and instructions were at once given to London and Birmingham to despatch by passenger train. The shipowners at Leith, however, when informed of the coming consignment stated that their sailings had been provisionally cancelled in consequence of mines in the North Sea, but that the matter was to be finally decided at a meeting of directors being held at the moment in a distant city. The meeting was interrupted by a trunk call and the chairman brought to the telephone. It had practically been decided not to sail the boat but after a long and somewhat trying discussion ending, if I remember rightly, in the unauthorised promise of a knighthood, the decision was reversed and our first obstacle removed. It was five o'clock in the afternoon before the type of wire to be used had been determined. The requirement was wired to Birmingham, thence to the contractors at Warrington, thence to the manager of the company at Chester who motored to his works, brought the necessary staff on duty and, as instructed, loaded the consignment on a special train which reached Leith about noon next day. Meanwhile, the stores from Birmingham and London had been packed and despatched by the night expresses, poles had been brought from Leven and the remaining stores were carted from Edinburgh depot. It remained for us to ensure their shipment. Elaborate arrangements were made with the railway companies concerned, the shipowners and the dock authorities, and from these various centres over 100 tons of stores were conveyed to Leith and shipped in about 24 hours.

During the early part of last year the gangs in the Scottish engineering

districts were largely augmented from other districts, and the consequent acceleration of engineering works was responsible for a great deal of special transportation arrangements. Frequently we were informed that, unless given consignments were despatched by certain steamers, the work would be arrested and the gangs kept waiting, and our difficulties were accentuated by the scarcity of light poles, a problem which was met by the purchase and issue of undressed native timber.

A consignment of 750 poles, which were lying on the Gareloch, had to be barged to Greenock, sailed to Leith, and shipped to a censored destination. The time at our disposal was very short, and it was estimated that we had only about one extra day in hand. Arrangements had been made for the poles to be discharged from the barge at the James Watt Dock, Greenock, the Caledonian Railway Company had been asked to provide the necessary wagons, and as is usual in such cases, the railway officials at the various points were warned to give the consignment special treatment. The poles were ready by the time required, but at the last moment the railway company discovered that the James Watt Dock was too congested to take the traffic. All our arrangements had to be cancelled, the Glasgow & South Western Railway Company at Glasgow was telephoned, and agreed to take the poles at the Albert Harbour, and to provide the necessary wagons. Then a day was lost because the poles could not be barged at Kilcreggan in consequence of a storm. Next it was discovered that the only barge available could not take all the poles, and 160 had to be carted to Garelochhead Station and sailed by the West Highland and the North British Railways to Leith. These companies had then to be communicated with in order that urgent transit should be given to the consignment. But even then our troubles were not over, for on the morning the poles reached Leith there was a local strike of railway workers, and very strong measures had to be taken before the poles were delivered at the ship's side. Fortunately they arrived in time for shipment.

Another similar case occurred with poles obtained from the Inverness area, which had to be shipped at Aberdeen. Our inspector had the poles examined in a remarkably short time, and by arrangement the consignment was despatched by special train to Aberdeen in order to catch the required steamer. But word was received by the engineer that the steamer was so heavily laden with a deck cargo of Admiralty stores, that she could not take more than 70 poles instead of 400, and that no guarantee could be given as to the quantity which could be shipped by the next boat leaving two days later. The engineer informed us of the facts by telephone, stating that unless 200 poles were shipped within two days his men would have to stop work until the stores arrived, and he asked us to deal with the situation. The Sectional Engineer at Aberdeen was asked to get into touch with local shippers in the hope of obtaining a special steamer, and he provided the name of shipowners who had two trawlers available. This firm was asked by telephone to make an offer, but they could not take more than 100 poles in each vessel, and wanted £50 each for the trip. This somewhat Aberdonian suggestion was rejected without hesitation. We next telephoned to the shipping company at Leith and were successful in arranging, by means which I dare not disclose in the Controller's presence, for the next boat to be so loaded that space for at least 200 poles would be available when she reached Aberdeen; and we then obtained a guarantee from the shippers that not less than 200 would be shipped there. By a similar arrangement the remaining poles were despatched by the next boat, and to our surprise and relief no complaint was received.

A most troublesome case, however, arose in connexion with certain lines of communication which had to be erected along the coast in an inaccessible district. The stores had to be dropped in given portions at thirteen different points along the coast, all but one of which were out of the route of the small steamer which serves that district weekly. It was therefore necessary to charter a special vessel locally. A likely firm of shippers was approached which fortunately had a small steamer free about the time required, and it had to be booked provisionally on the spot. The poles required were obtained partly from the Gareloch district and partly from Renfrewshire, and it was decided to load first at Greenock and then at Kilcreggan. The other stores were despatched in consignments from Birmingham, London, Warrington, Middlesbrough, Shields, Sheffield, Derby, Nottingham, Glasgow, Inverness, Leven and Edinburgh. It was essential that every item of stores should reach Greenock in time, as the vessel had been secured under a time charter; and as there was no other means of transit to the various ports, most elaborate arrangements had to be made to obviate a hitch. We arranged with a local firm of shipping agents at Greenock, with the two railway companies concerned, and with the pole contractors, for the acceptance of the various consignments as they arrived and for the loading. An inspector from the Engineering Department supervised the loading so that the stores could be shipped for convenient discharge at the various ports of call, and he had to be given most detailed instructions. The arrangements made proved successful, and the whole consignment, weighing 180 tons, was at Greenock by the time required without a single article missing.

Incidents like these could be multiplied almost indefinitely, but time will not permit.

Work of this nature involves an immense amount of telephoning and telegraphing—indeed in one fortnight during the early days of the war Edinburgh depot sent over 300 telegrams—and its successful accomplishment is only possible because of the freedom of action given to local representatives of the Stores Department, and because the relations existing between the Engineering and Stores Departments are most cordial in character.

A paper of this description would not be complete without some reference to depot management. In every depot there is a staff duty which arranges for the payment of salaries, wages and other incidental charges, and deals with staff matters. Then safeguarding arrangements are in force because

so much valuable material is kept in stock. All material of saleable value is stored in locked cupboards, or compounds, and the stocks of valuable items are subjected to frequent surprise checks. In addition to this, all the stocks are checked annually by officers of the Headquarters' Stocktaking and Audit duty and triennially by officers from the Accountant-General's Department. Differences disclosed between the stocks and the ledger balances are reported, and adjusted after the necessary authority has been obtained.

Every depot is equipped with fire appliances and fire drills are held regularly. Watchmen are employed so that depot premises are never left unguarded and arrangements are made for telegraphic demands received after hours to be dealt with or referred to the Officer in Charge.

The system at all the depots, with very slight modifications, is the same, and every quarter each depot and each headquarters section prepares for the information of the Controller a quarterly report based on the current statistics and including all items of interest, details of new procedure, experiments in storekeeping methods, and so on. These reports are circulated, and thus the controlling staff and the heads of the various sections are kept in touch with the work performed by other sections. In this way a certain unity is maintained throughout the Department, and officers in charge of sections and depots are enabled to retain that sense of proportion which is essential to harmonious working. While relying on the effectiveness of the methods here outlined, officers of the Department are in no sense hampered by them, and in all our operations we realise that the Stores Department can best contribute to the efficiency of the Service, by endeavouring in every detail to be as helpful as possible to the Departments which we serve.

CORRESPONDENCE.

TELEGRAPH TARIFFS AND ECONOMIC NEEDS.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

THE recent attention given to telegraphic tariffs and economic needs is doubtless a subject that deserves thorough investigation.

The varied opinions of the experts makes this only too apparent. I therefore tender an observation on this subject, although handicapped officially.

Up to the present open and somewhat non-committal policies seem to be advocated. But why not bolder? We want something tangible! Personally, I do not believe the telegraphs will ever show a balance in their favour if run on proper lines. One ought not to dwell on this belief perhaps, but that is my firm opinion. How can we compete with the telephone? Are not the subscribers doing most of the work essential to the system themselves. I maintain that very few short telegrams get less than twenty minutes solid attention bestowed upon them during transit. Following on this we have engineering, supervision, and material to be accounted for. Armed with the foregoing facts, I would suggest that the policy adopted can only be that which aims at maximum output with minimum expense. The tariff should be that which is most suitable in furthering commercial enterprise. It must, therefore, not be so low that a telegram would be sent as freely as a letter, nor so high as to offer the slightest retardation to commerce reaching its zenith. This achieved the Government must inform the nation that the telegraphs are akin to, say, sanitation as regards their usefulness to the public.

I would further suggest that all our colonies and foreign possessions should be linked with a "wireless chain"—it is possible; let the tariff be attractive. Unfriendly nations should be handicapped with a high tariff.

R. G. LEATHERN.

Central Telegraph Office, E.C.,
June 26, 1916.

RATIO OF WORK AND WAGES.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

YOUR leader on the ratio between work and wages should prove to be the basis of an extremely interesting discussion. It is indeed a hopeful sign that you recognise the weakness of the present scale wages system which is too favourable to the slacker and the inefficient and absolutely unfair to the smart and efficient officer. What is the remedy? "Some more elastic recognition of merit," as you so admirably put it. Commendatory entries on a man's record are not much of themselves. Postmasters should be empowered to grant or, at least, to recommend additional increments for consistently good work, such increments, up to a certain number to be carried beyond the normal maximum. It may be argued that such a plan would cut into overseers' rates of pay. That is done already in the case of S.C. & T.'s in receipt of both technical allowances. Besides, increased efficiency would probably follow the introduction of such rewards and it might even follow that overseers would not be necessary.

"OPTIMIST."

[Owing to pressure on space the column of PERSONALIA is held over until next month.]

LONDON TELEPHONE SERVICE NOTES.

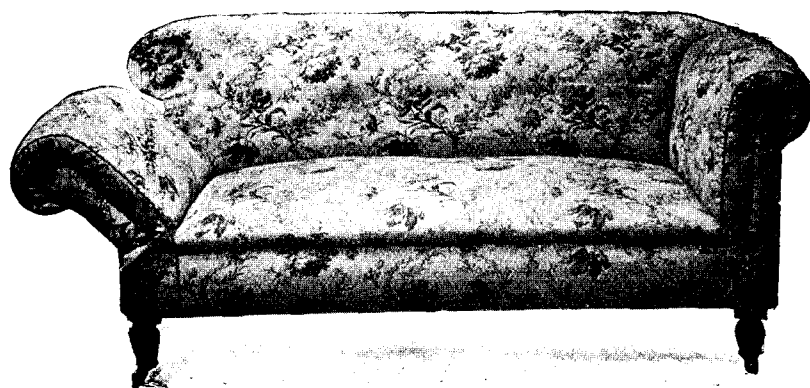
THESE Notes are being written in "War Savings Week" and the L.T.S. like the country generally is making a special effort to contribute a pile of sixpences to provide for the requirements of our troops. The "Research Section" of the National War Savings Committee has computed that each fifteen-and-sixpenny certificate purchased represents the provision of 124 cartridges. As we have pointed out before in these Notes the L.T.S. has now about 800 members "gone to the war," and assuming that, say 4,800 (including all grades) remain at home, there are (if we are to carry out to a small extent the ideals of a "Guild" such as that referred to in the first article of the current issue of *St. Martin's le Grand*) six persons to subscribe for the equipment of each L.T.S. warrior. Assuming further that each team of six may be divided into five operators to one supervisor or clerical officer we find that by a contribution of an average of 6d. per week from each operator and 1s. per week from each supervisor or clerical officer, we should be able to provide one parcel of 124 cartridges per month for each absentee. That is four cartridges per day and that doesn't seem excessive according to the present day "standard load" for the expenditure of munitions. It is a long way short of 220 per hour! Anyhow, we feel certain that everyone in the L.T.S. will, notwithstanding a multitude of other calls, make an earnest effort to put something into the general pool, particularly when the fortnight's annual "rest period" is over for 1916. Many of the exchanges are already doing so much in this direction that one thinks of them as Stock Exchanges rather than as Telephone Exchanges. We trust the motto of the L.T.S. in this, as in other matters, will be "Let London Lead," or possibly in this one instance "Let London Lend Lead"—if bullets are made of lead.

It must not be imagined however that London (*i.e.*, the London Telephone Service) lends only—it gives, and the most recent example of its generosity in giving is to be found in the result of Miss Heap's appeal for the "Star and Garter" Hospital. Many and various have been the methods adopted by the exchanges to swell the tide of contributions to this worthy object. "Paddington" had a garden fete at Gunnersbury on June 24, and even though the weather was unkind we are able to record that a sum of something like £30 was secured for the Fund. Other exchanges, as Victoria, London Wall, Avenue and Mayfair (of these we have heard, though this is probably far from an inclusive list), arranged sales of work, of fruit and of flowers. The latter exchange would seem to have stumbled across the "philosopher's stone" for they netted a sum of about £12 almost by the waving of a wand.

"Regent," we learn from a correspondent, organised an entertainment on June 24 for wounded soldiers who, it is reported, expressed themselves as regarding it as "worth while being wounded in order to partake of such a reception."

The telephone societies, or rather their respective committees, are active with preliminary arrangements for the meetings during the coming sessions. The Telephone and Telegraph Society, notwithstanding the difficult condition of the times, seems likely to have an "all star" programme, whilst we hear that the London Telephonists' Society proposes to commence its season with a *conversazione*—whatever that is. There is a proposal to take the "Memorial Hall" for this gathering and to admit members without special charge. If the proposals mature we should see a packed gathering and a new record for attendance set up. As there is also a prospect of an address from Col. Ogilvie at a later meeting and a debate on that question of absorbing interest to telephonists—the Staffing of the Phonogram Room—the membership of the society this year should fall little, if any, short of 1,000!

There is much more of interest just now, but limitations of space are not to be trifled with in these days of restricted paper supply, and since there is no possibility in this JOURNAL of encroaching on the margin (the Editor might reconsider this if a really paying advertisement were offered) we are constrained to postpone all other items till our next issue.



CHESTERFIELD SETTEE.

5 ft. 6 ins. wide.

Both ends to drop.

Stuffed all hair. Upholstered in best quality Cretonne,

ONLY

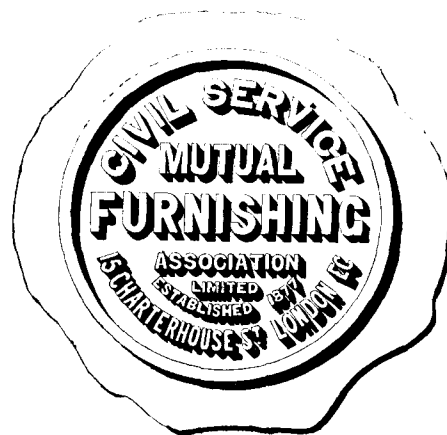
£6:17:6

Carriage paid to any Goods Station in United Kingdom.

For Comfortable Furniture

of Sound Construction
and Tasteful Design
at Moderate Prices

WE ARE UNEXCELLED.



CIVIL SERVICE Share Purchase and Investment Society, Ltd.

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year.	2 Years.	3 Years.	5 Years.	7 Years.	10 Years.
17s. 5d.	9s. 1d.	6s. 3d.	4s. 1d.	3s. 1d.	2s. 5d.

Stocks and Shares bought or sold through the agency of this Society.
Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society exceeds the sum of £600,000.

When your Safety Razor pulls

Don't throw away the old blades; pack them up and send them to us, and we will re-grind and re-set them and return them to you post free, and charge you only **ONE SHILLING** per doz. blades.

EMPIRE RAZORALITIES

(Dept. T.J.)

16 LIVERPOOL STREET ARCADE, LONDON, E.C.

What about your needs

for the

Holidays?

You will be wanting a

Raincoat, or a new Coat or Skirt, a Dainty Frock or Silk Sports Coat, Underwear, Blouses, Shoes, or a Trunk, &c.

Send for the NEW MODE BOOK and details of the 'Times' System, quite private and confidential, from 5.- monthly.

A Nurse writes:— "Your system is certainly a boon and a blessing."

Send a postcard for full details sent by return quite privately. Recommended everywhere.

SPECIAL TERMS to Telephone and Post Office Staff.



Ladies' Tailors,

CRICHTONS' Ltd.

Furriers and Outfitters,

14, CRICHTON HOUSE, DEVONSHIRE SQUARE, LONDON, E.C.

(One minute from Liverpool Street Station).

WHERE TO STAY.

The attention of our Readers is directed to the following list of Boarding and Apartment Houses.

BARMOUTH.—West-End Boarding Establishment. On sea front. Excellent catering. Highly recommended. Restful, comfortable and pleasant. Moderate tariff. Winchester.

BARMOUTH (the Beautiful "Glencairn").—The most comfortable Private Hotel and Boarding Establishment in North Wales. Charming situation overlooking bay and mountains. Spacious well-furnished lounge. Excellent and liberal cuisine. Moderate inclusive tariff.

BARMOUTH, N. WALES.—Centrally situated. Commanding beautiful view of Cardigan Bay and surrounding hills.—Mrs. Jones, Bodann, Harbour View.

CLIFTONVILLE, MARGATE.—"Rosenburgh" Boarding House. 110 bedrooms. Situated best part of town. One minute to sands and concert parties. Four minutes to tennis and bowls. Social evenings and dancing in large recreation room. Hot luncheon, late dinner, excellent cuisine. Special terms to those quoting "T. & T. Journal." Phone 233.

COLWYN BAY.—Comfortable Apartments. Central, near sea and woods. Every comfort and attention. Terms moderate.—Mrs. Proffitt, "Seaforth."

DEAN FORREST, Severn-Wye Valleys.—Beautiful Holiday Home (600 feet up). Spacious house, grounds, bath, billiards, tennis, croquet, motors, magnificent scenery. Vegetarians accommodated. 35s. to 42s. week.—Photos, prospectus, Hallam, Littledean House, Littledean, Glos.

S. DEVON, TORQUAY.—Furnished Apartments with or without board. Moderate terms. Good recommendation for cyclists. Near sea, downs, golf links, park, church and country walks.—Mrs. H. Bailey, 149, Babbacombe Road, Babbacombe.

EASTBOURNE.—"Polytechnic" Boarding House. Recommended by "Polytechnic," Regent St., since 1894. A comfortable holiday home. Liberal table. Terms from 25s. w'kly.—Mrs. Edwards, 109-111, Tideswell Rd.

EDINBURGH.—The Cockburn Hotel, first class Temperance, adjoining Waverley Station.

EDINBURGH.—Board for Visitors, day or week.—Misses Carter, 6, Howe Street.

ILFRACOMBE.—"Arcadia" Private Boarding Establishment. Arcade Road. Grand sea view (right on front). Every comfort, good cuisine, highly recommended. 12 Bedrooms recently renovated throughout.—Mrs. E. Millington, Proprietress.

ILFRACOMBE.—Fair View. A very popular Boarding House, highly recommended by Postal Officials. Splendid bedrooms, large lofty dining-room, drawing-room, smoke-room, bathroom, &c. Electric light. 3 minutes from promenade. Inclusive boarding terms 25s. per week.—Proprietor.

ILFRACOMBE.—Osborne Private Hotel. Two minutes sea, Tors Walk and Capstone Parade. Every comfort with moderate inclusive terms.—F. Collins, Proprietor.

JERSEY.—STAR HOTEL. Facing the harbour. Very moderate inclusive terms. Illustrated booklet, with full tariff and some interesting information, post free. Passport necessary.—A. Raynor Smith, Prop.

PENMAENMAWR.—Bryn Llwyd. Two sitting-rooms, four bedrooms. Close to sea and mountains. Every comfort. Terms moderate.—Mrs. Jones.

SWANAGE.—The Highcliffe Private Hotel and Pension. Unrivalled position on sea-front. Near Golf Links. Excellent cuisine. Inclusive terms. Enlarged 1911 & 1912.—Telephone: 47 Swanage. Mrs. Hooke, Proprietress.

TORQUAY.—Apartments conveniently situated in best part of town. Near trams. Commanding fine view of bay. Ten minutes from sea. Cool position for summer. Moderate terms.—Fitzherbert, 5, Lisburne Crescent.

WENSLEYDALE.—The Hough, Aysgarth, S.O. About 1,400 ft. above sea level, facing S.W. Magnificent views. Waterfalls and ruins in neighbourhood. Recommended by officials. Particulars from Miss Smith.

WESTON-SUPER-MARE.—The Lynn Boarding House, 22, Salisbury Terrace. Best position on sea front (facing Grand Pier). Convenient for all amusements. Every comfort. Liberal table. Week-ends from 10s. 6d. Highly recommended. Billiards.—Mrs. N. Evans, Proprietress.

"VISITORS TO LONDON."

TRANTER'S TEMPERANCE HOTEL,

6, 7, 8 & 9, Bridgewater Square, Barbican, E.C.

MOST CENTRAL FOR BUSINESS OR PLEASURE.

2 minutes' walk from Aldersgate Street Railway Station; 7 minutes' walk from St. Paul's Cathedral and G.P.O. Very convenient for Shopping Centres, Amusements, and all Places of Interest. Terms: Bedroom, Breakfast, and Attendance, from 4s. Other meals optional. Tea, from 1s. to 1s. 9d. Electric Light. Night Porter. Established 1859. Telegrams: "Healthiest, London." Phone: Central 959. Write for "How to Spend a Week in London," with Tariff and Testimonials Free. Quiet, Home-like, and Comfortable. This Old-established Hotel is again under the Management of

G. T. S. TRANTER, Proprietor.

Last Word

THE UPSIDE-DOWN PIPE.

Recommended by London's leading Journals.



Illustration, showing that it looks just like an ordinary pipe—also section.

If you haven't joined the

REAL PIPE-JOY

Brigade of Smokers

you should lose no time in doing so. Send 3/6 for a "Last-Word" Pipe, and enjoy the exclusive privileges of its smokers. This pipe smokes from the bottom upwards, yet the tobacco does not fall out: it looks like an ordinary pipe, shows no light at night, and is the only pipe that smokes perfectly in rain and wind. Thousands of satisfied users.

IT DOUBLES YOUR PLEASURE

Gives you the full unspoiled fragrance of the tobacco, and saves a quarter of it; smokes perfectly in rain and wind; no hot ashes in your eyes; positively banishes "juice"; every shred of the tobacco is enjoyed, does not require constant relighting, even in wet and windy weather, or cleaning. Pin a P.O. or cheque to this advertisement. You take no risk because satisfaction is guaranteed or money refunded.

Made from selected French briar in one piece, no loose parts to get out of order. Sent by insured post.

"Popular" Grade, 3/6; Silver-mounted, 4/6; Guaranteed Quality, finest French briar, 6/-; Silver-mounted, 7/6.

T. A. WYSE, 6, GERRARD MANSIONS, GERRARD STREET, LONDON, W.

THE Telegraph and Telephone Journal.

VOL. II.

SEPTEMBER, 1916.

No. 24.

CONTENTS.

	PAGE		PAGE
THE TELEPHONE SOCIETIES. BY ARTHUR E. COTTERELL ...	219	EDITORIALS—	
ROUTING ...	220	A GLORIFIED POST OFFICE...	226
A TRANSFORMED POST OFFICE. BY R. BAXTER ...	221	THE CHANNEL TUNNEL ...	227
UN BLUFF TELEGRAPHIQUE ALLEMAND—20,000 MOTS A L'HEURE	222	HIC ET UBIQUE ...	227
BELLTEL THE MYTH ...	223	TELEGRAPHIC MEMORABILIA ...	228
TELEPHONES TO ALL PARTS ...	224	LONDON TELEPHONE SERVICE NOTES ...	229
TELEGRAPH LEGISLATION IN THE UNITED STATES ...	225	PERSONALIA ...	231

Subscription: To the public, 4s. 6d. per annum, including postage. To the Staff, 2s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies: To the public, 3d. each, or post free 4½d. To the Staff, 2d. each. Orders should be sent to the Managing Editor, G.P.O. North, London.

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, Fleet Street, London, E.C.

THE TELEPHONE SOCIETIES.

BY ARTHUR E. COTTERELL.

A QUARTER of a century having passed by since the inauguration of the first telephone society in the United Kingdom, we find ourselves at a milestone where we may well pause for some reflections on the past and for thoughts as to the future.

It will doubtless be generally agreed that these societies have been productive of much good and are capable of advancement in the years to come.

Before entering upon some suggestions for the future it may be interesting, especially to our colleagues on the Telegraph side, if mention is made of the circumstances which gave the germ of the idea which ultimately led to the formation of the first of these societies, which came into existence in Birmingham at the close of 1889.

In the early eighties, somewhere about 1882 or 1883 as nearly as I can recall it, I was present at a meeting of a small society which existed amongst certain enthusiastic telegraphists of the Birmingham Post Office, who had banded themselves together for the discussion of telegraphic subjects. Their meetings were held in a basement room in the old County Court in Waterloo Street. On the occasion in question the late Mr. Frederick Brown, who was the local manager for the National Telephone Company in Walsall, and founder of the Walsall Electrical Company, was fulfilling a promise to give a lecture, and in exercising the privilege of introducing friends on that occasion secured my admission.

The lecture I remember was on the subject of telephonic induction, with demonstrations on a neat model pole route carrying a single line, and also straight and twisted loops. With the aid of a Ruhmkoff coil and battery attached to the single line and telephone receivers joined alternately to the other circuits, his various points were made manifest to his audience in a practical way. During the course of the proceedings which followed the lecture some kindly person presiding over the meeting thanked me quite undeservedly for my presence and invited me to contribute some remarks on the subject of the evening, whereat I plunged into a maiden speech. What most impressed me, however, was the pleasure and advantage which I perceived must arise from such gatherings, which afforded opportunity for the discussion of topics in which all present were keenly interested, and also the thought that if there was room for such a telegraph society there was

perhaps greater need for a society dealing with the newer and less known subject of telephony. At that time, when only a small staff existed, such an idea was impracticable, but the thought remained, and after my appointment as District Manager in 1886, the staff having grown in the meanwhile, I frequently urged its advantages and ultimately, thanks to the great energy and enthusiasm displayed by the then Chief Clerk, Mr. W. Johnston (now the General Superintendent of the Chili Telephone Company), the Birmingham Telephone Society came into being as already stated; thus owing something of its inception to the earlier activities of the older telegraph society.

During the earlier years of the telephone societies the majority of the papers read were necessarily of an elementary character, but in the course of time it was natural that the progress made in telephony should lead to the production of papers of a more advanced order dealing with specialised branches of the work.

Clearly if the societies are to afford the highest advantages, it is necessary to secure a continuance of the most advanced papers possible, otherwise stagnation must result and there would be a loss of interest on the part of the more competent members, either of which results would be deplorable. The desirability of catering also for less advanced members of the staff by the allocation of certain evenings to more elementary papers which would help them in taking an interest in telephonic subjects is, however, worth a thought. To be fully useful and popular it is obvious that the transactions of these societies should meet the needs of all. The staff is from time to time recruited from those who are beginners, and seeing that the societies are a convenient means of instruction and for engendering a spirit of enquiry, it seems desirable that they should afford every inducement to all possible members. This seems to be a vital principle which should be carefully watched, for certainly there can be little inducement to the tyro to listen to papers and discussions not only of a character outside his range of knowledge and experience, but also frequently couched in technical terms the meaning of which he is unacquainted with.

In these days when specialisation rules greatly, it seems perhaps even more desirable than before that there should be some paths open which would facilitate the study of general principles by those desirous of grasping a good all-round knowledge of the enterprise with which they are associated. In times past the opportunities were greater for obtaining a transfer to other sections of the work on the exhibition of qualifications, and indeed the practice was rather to encourage members of the staff to acquire

a good all-round knowledge and so qualify themselves. With the growth of the business and the greater need for specialisation, it is apparent that the various departments must now work on somewhat different lines without the same fluidity of interchange, and consequently there is perhaps less inducement than formerly to the tyro to devote himself to a study of those sections of the work which do not relate to his particular duties.

It cannot be gainsaid, however, that the wider the knowledge, all other things being equal, the more efficient the officer, who certainly would be better equipped for performing his own particular duties in proportion to the extent of his acquaintance with the business as a whole. Moreover, the wider his knowledge the greater will become his interest in a service the fascination of which grows and abounds as the lines of study expand and intersect one another.

Speaking at one of the National Telephone Company's staff dinners the late Sir John Cameron Lamb—one of the revered names at St. Martin's le Grand—said: "When I think of the telegraph and the telephone I cannot help calling to mind a saying of a wise man—I think it was Bacon—who said, 'Reading makes a full man, writing a correct man, and speaking a ready man.'"

These words seem to be very significant of the meaning of our telephone societies; what they are, what they should be and what they can be. The scope is simply enormous.

As already stated the discussion of advanced papers should and must go on, but let us not forget the needs of those who have barely entered the field.

Whether their requirements can be best met by the establishment of junior societies, or as previously suggested by the allocation of certain evenings by existing societies, is a question which should rest with those responsible for the local arrangements. As to the papers which seem to be so desirable, indeed necessary, these are doubtless many officers in different parts of the country who would be very willing to afford these. The act of doing so would not be without some attendant advantages to the writers themselves. Doubtless these are numerous persons well able to produce excellent papers of a more or less elementary character who hesitate to attempt anything more ambitious, but who, having once broken the ice, might be encouraged to higher flights. But even the writing of a paper on a familiar subject is not always quite so simple a process as appears at first sight. There will be a desire to present the facts accurately which may necessitate sometimes a reference to certain books, etc., in order to confirm the accuracy of a proposed statement or to revive the memory upon some half-forgotten point. When such necessity exists the attendant advantage at once appears in the strengthening of the writer's own knowledge; thus we perceive circumstances tending towards the production of both the full man and the correct man.

Then, too, with the provision of a certain proportion of papers of an elementary character, it must follow that the newer comers would be encouraged and emboldened to enter the field of debate wherein flourishes the ready man.

ROUTING.

IN modern traffic study there is no more interesting subject than routing, for in efficient routing is involved not only the quality of connexions, but economy in the use of trunk and junction lines. Really scientific routing, of course, was not possible under the old conditions, and even now, although the facilities are greatly improved, wholly satisfactory routing arrangements are not yet practicable. Steps in the proper direction, however, are being taken steadily, and as the facilities are bettered, the routing arrangements will be correspondingly improved. But even with the liberal provision of lines, the most careful scrutiny of the flow of traffic is essential, and such scrutiny must be minute to be effective.

Districts which adjoin each other must be closely in touch with each other's facilities; and, in addition to having up-to-date trunk and junction charts constantly in front of them, traffic officers must be familiar with the traffic on all lines connected with exchanges to which exchanges in their respective districts work. Difficult as it will be to keep such information up to date, it seems

to me that lists must be drawn up showing the relative number of calls, and the amount of delay on all lines. Towards this end, I think, action should be taken as soon as possible.

For instance, if it were known, from traffic figures, and delay records that traffic from Edinburgh to, say, Manchester would find a better route by Newcastle than by Glasgow, or *vice versa*, it would be an enormous advantage. It is, of course, known generally, which is the best route to a given place, and the routing charts are prepared accordingly, but this is not sufficient. The general experience that calls from one place to another are got through more expeditiously, and that the speaking is better by one route than by others may not always be due to meagre line accommodation in the one case, or to less satisfactory circuits in the other. In the first case general operating may be a factor, and in the second, the not too discriminate use of unsuitable circuits, which may only form a very inappreciable part of a long chain of lines. If the traffic and delay on all the circuits on the route were known such matters as inefficient operating and improper use of unsuitable lines would be more readily detected, for the cause or delay or difficult speaking would not then be hastily attributed to circuit congestion or imperfect means of communication. In this connexion there is reason to fear that transformer circuits only intended for direct communication are sometimes used for through calls. Doubtless the extension of the underground system, and the consequent discontinuance of superposing will improve matters, but superposing must continue to be taken advantage of widely where unlimited wire accommodation is impracticable.

In connexion with the matter of close scrutiny of the traffic passing over the various routes, regular examination of the tickets by the traffic staff is likely to provide the most effective guidance, for it will not only be a sure check on the need of circuits, but it will constitute an infallible means of supervising circulation. It should be done in no haphazard or spasmodic way, but should be a regular and properly organised examination. There is no better way than to examine the tickets, junction as well as trunk tickets, made out at all the exchanges in a district for different weekdays, on a fixed date every month, and to extract such particulars as call for notice. On the detection of abnormalities or irregularities in circulation, as in other matters, the exchange in question should be specially visited by a traffic officer and a searching enquiry made into the handling and routing of the traffic. At exchanges where there is not expert supervision this is most essential, but it should be done in all cases. Thus all defects could be ascertained, and such routing re-arrangements and adjustments as are found necessary could be carried out expeditiously and efficiently. Such a method, moreover, would afford an excellent means of training and encouraging the operating staff, for it must be well known that telephonists have much to learn in the matter of handling traffic. Now that most exchanges are provided with routing charts, it is of the greatest importance that these charts should be kept up to date. It must never be forgotten that routing is an economic as well as a service question, an economic question since proper use of existing lines is an important element in the provision of new lines. The heavy telephone-telegram and military and naval traffic recently thrown on trunk and junctions increases the importance of the routing problem, and it should not be taken for granted that under war conditions it can stand over. All adjoining districts should have a regular, say quarterly, interchange of junction and trunk maps, and on those maps the busy hour and daily traffic on the various routes should be shown. This would be a tremendous advantage to the headquarters' staff in connexion with the formulation of trunk programmes, and would be an excellent safeguard against the uneconomic provision of lines; indeed it would do much to place the question of routing and junction and trunk circuit provision, which, after all, are inter-related on a scientific service and sound economic footing.

The present is not the best time to introduce such innovations, but it is interesting to put them on record for the consideration of the few left among us who have time to think about the developments which the advent of peace in Europe will make possible.

R. G. D.

A TRANSFORMED POST OFFICE.

By R. BAXTER.

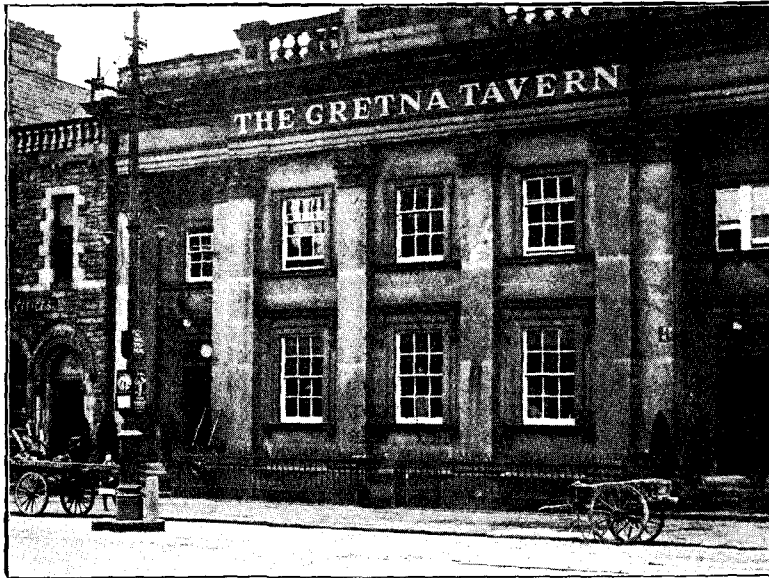
THE building represented in the illustrations to this brief article will be of interest to readers of the TELEGRAPH AND TELEPHONE JOURNAL as the initial venue of the laudable project taken up by the Liquor Control Board of finding a long-wished-for happy medium in connexion with the drink question.

It is hoped by the admixture of temperate patrons of the new "tavern" to elevate the less desirable element of the customers. The experiment may prove whether this is possible.

Leaving the fair Border City, Carlisle—as we did in 1914—the tremendous change which we found had been wrought in a few short months was very noticeable on our return at the end of 1915. The picture was not the same. In 1914 it was as fair as that which could wellnigh be desired, but the extension of the human canvas appeared, at Christmas 1915, to have drawn it all out of shape and proportion. Its perspective had somehow changed and become, particularly at the week-ends, incongruous. The old faces had either departed to the "mill" that grinds slowly, or were swallowed up in a motley crowd of pushing, swearing and oft-times staggering men, who under certain conditions would prove to be honest good fellows. Sudden prosperity would appear to have slackened a withholding rein. The bit was between the teeth, and control gone. This was very apparent at the entrance to the railway station where policemen endeavoured to perform the superhuman task of maintaining an equable temper alongside absolute indifference on the part of a large number of men to the requirements of common decency and order.

So great has been the increase in the number of prosecutions, for drinking misdemeanour, that Carlisle has had particular attention focussed upon it. It was apparent that something should be done to protect its traditional title "The Merrie City"—merrie—but not by reason of unbridled carousal.

It had doubtless gained the title from the heartiness of its people, and why should we not be merry, blessed as we are by a rural district which compares favourably with any part of our fair island

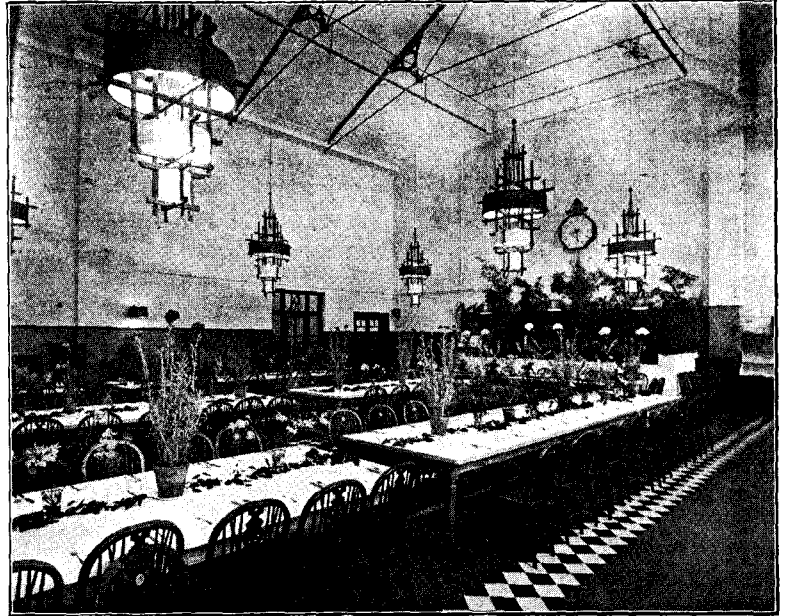


THE GREटना TAVERN, CARLISLE (FORMERLY A POST OFFICE).

home; hills and vales teeming with the spirits of romance; and piles—the handiwork of man—which carry us to far-off Roman days. There is enough and to spare to make "merrie" the heart and life of any man if his desires be but drawn to the truth that food and drink for the mind and soul bring more lasting joy than the cramming and swilling of the stomach. It was, then, in the deepening of the shadow thrown upon this fair borderland, that a cry for light was

heard, and the question introduced how best to meet the need for restraint.

The increase in the number of the population has created a perfect house famine in the city and very few—if any—suitable buildings were available for the purpose of setting up a new place of ease on model lines, where refreshment could be obtained and



THE GREटना TAVERN DINING ROOM.

partaken of without lapsing into a state of semi-madness and imbecility.

The Liquor Control Board were quick to observe that the old Post Office building was, from its central position near the railway station, and its large, airy and well-lighted interior, an ideal place to instal the first Government tavern "The Greटना Tavern." The building has served the public in various ways since its erection by Willams, of Liverpool, in 1840 at a cost of £6,800. It was then held by shareholders and was named "The Athenaeum." It contained a spacious lecture theatre (more recently the sorting room) and rooms used for literary and social gatherings. It also housed the nucleus of the present "Museum" now quartered in "Tullie House" which is situated midway 'twixt the Cathedral and the Castle.

Any reader interested in matters historic would be well repaid by spending a day visiting these three piles of interest which are brimful of the material links which connect the builders of "Hadrian's Wall," through the red King Rufus, Edward the First, Robert the Bruce, Mary Queen of Scots, Prince Charlie, and Sir Walter Scott with the present day.

About 1860 the "Athenaeum" was purchased by Sir G. H. Head for £4,000, and later, when it became necessary to find increased accommodation for Post Office work which was carried on in the building to the right, which appears to be an annexe, the larger and more consequential edifice was procured by the Post Office authorities. It is this latter portion in which the "tavern" has been opened. The portion of the combined whole to the right, above termed the annexe, still contains the telegraph and phonogram rooms.

The main building has, with slight alteration internally, been converted into an open bar, a refreshment room and cooking kitchen. The bar has been opened in the old post office counter, and the refreshment room in the spacious, lofty and airy room—the late sorting room. Here, invitation is offered, under the best conditions to the weary worker, who would perhaps otherwise be boxed up in some small badly lighted room to pass an hour's ease, partake of a good meal at moderate cost, write to his friends, hear a good song or pianoforte solo, and take, if he wishes, a pint of beer

and leave the place in a respectable frame of mind and body. Strictly speaking the endeavour is presumably in some measure to restore a resting place upon the lines of the olden day tavern, where men were wont to meet, discuss topics of interest, smoke their pipes, drink in moderation and hic them home, mentally and socially none the worse for an evening spent in pleasant company and surroundings. This end will doubtless be attained if the desire for beer, which imbibed in excess apparently produces much that is very undesirable, can be subordinated to the desire for that good company and fellowship which tends to satisfy the heart and mind rather than the craving of an unquenchable thirst.

UN BLUFF TÉLÉGRAPHIQUE ALLEMAND— 20,000 MOTS A L'HEURE !

DESTRUCTIVE criticism has its uses and in the sphere of practical telegraphy its effect will probably be salutary, provided that the arguments are well founded and also that the critic does not expose himself to the charge of onesidedness. The May number of the quasi-scientific magazine *La Science et La Vie* contains a cynical article by M. Lucien Fournier in which he, to his own satisfaction, lays bare German psychology in its relation to telegraphic invention. In the belief that the writer's views with reference to the Siemens-Halske printing telegraph machine may interest the readers of the TELEGRAPH AND TELEPHONE JOURNAL, a translation of a considerable portion of the critique has been made.

The opening portion commences thus :—

"Having decided to astonish the world by her colossal audacity Germany discovered, among the technical staffs of all branches of science whatsoever, those innovators worthy of her ambitions. Frequently her engineers overshot the mark—the practical limit. Sometimes they reached it. More rarely, however, have they 'gone slow' in order to arrive at less grandiose conceptions, but when they did, their excuses for the return to normality—to the needs of real life—took the form of a solemn affirmation that they had gone too far, that their ideas would only fructify in the course of years, possibly centuries. They had germinated prematurely in an age too young ! Telegraphy furnishes a striking example of the characteristic mentality of the race, of the Teutonic vanity which gives birth to ideas '*les plus abracadabrantes*' in order to exalt its genius only to return to the point of departure as soon as the uselessness of the effort is recognised. Ten years ago the engineers of the Siemens-Halske Company, of Berlin, constructed an apparatus capable of transmitting something in the neighbourhood of 20,000 words an hour. All the machines in use in other telegraph administrations throughout the world cut sorry figures by the side of this monster which, however, could not be denied the merit of technical audacity. The Hughes only gives an output of 1,800 words and our famous Baudot merely attains 2,400 words per hour. The German Government was eager to put the phenomenon to the test and constructed special lines for the purpose. For several years foreign administrations had to submit to a Germanic diplomatic touting, particularly importunate, in favour of the new machine whose merits, officially catalogued, destined for it a most brilliant future. The various administrations turned a deaf ear to the solicitations, not by reason of national pique but simply because the great devourer of telegrams was so exacting, for it needed, in addition to special lines, a staff so numerous that the average per operator did not appear to be sensibly greater than that achieved by more modest installations. Moreover, this most delicate machine was subject to frequent derangement, and further no telegraph administration, not excepting the German, had need to transmit 20,000 words per hour over the same wire. The Austrian Government alone installed the apparatus, which was tried upon the Vienna-Trieste line, but no information is available as to the length of time it was actually working. The enterprise, colossal in its *debut*, tumbled to zero after a respectable number of trials, less and less conclusive, but the engineers knew how to make a clever use of the invention, and, taking their cue

from the principle of 'the greater involving the less,' did not hesitate to smash up their god in order to utilise the pieces in favour of a divinity of quite a lower order. As a matter of fact very few of the parts of the abandoned mechanism served for the construction of its successor. At this time the German telegraph administration had already adopted our Baudot, the patents of which had become public property, but in spite of their cleverness the specialists over the Rhine did not succeed in constructing according to their own ideas. They found it necessary in creating a national system of competing with the French, to 'lift' the essential parts of French telegraph apparatus. In fact the new German machine is only a falsification pure and simple of ours. The original machine was automatic, that is to say the telegrams instead of being transmitted by hand, had to undergo a special preparation by means of a perforator which pierced a series of little holes in a long band of paper. This band or slip was subsequently put through an automatic transmitter. This long-standing principle is in vogue in England and in the United States, but the Latin nations prefer manual transmission which facilitates repetitions and the corrections of errors. Besides, M. Baudot had himself adopted automatic transmission in connexion with his earlier models, but he did not fail to recognise the disadvantages and decided to abandon it forthwith. The Germans, however, have remained true to their original idea."

M. Fournier continues his article in contributing a full description of the mechanical parts of the Siemens-Halske installation, and points out that the five-unit system adopted by the Germans is purely and simply that of the Baudot, as a comparison of the alphabets will show. The only difference lies in the allocation of letters, figures or signs of punctuation to different electrical combinations. Even the principle of the Siemens transmitter owes its origin to the invention of Wheatstone, this part of the instrument being simply a modification of the English machine. The technical details are, however, subordinated to the discussion of the economic value of the apparatus, and the writer proceeds :—

"Generally speaking it may be said that the new German instrument, which appears to have been inspired by the one originally constructed, is based purely and simply upon the principle of the Baudot. One might even ask what motive actuated the inventor since its output is not greater. Its speed may vary from 200 to 1,000 revolutions per minute, that is to say from 40 to 200 words. But if regard be had to the fact that the maximum output is never attained in practice, it will be found that the Baudot with its 180 revolutions per minute furnishes 36 words for each keyboard, and since on important lines it is usually quadrupled the effective output reaches 144 words per minute greater, without the shadow of a doubt, than that achieved by the German invention of which the engineers seem to be so proud. When, at the outbreak of war, the Germans informed us that they possessed a telegraphic apparatus of extraordinary rapidity, designed to meet the needs of their armies in the field, we might have thought for the moment that our telegraphy was inferior to theirs. Far from it. The Baudot has discovered no serious rival abroad and it has met every demand made upon it not only by the Army but also by the State. A high German Post Office official has perhaps appreciated the Siemens-Halske at its true worth. He says that with a mean speed of transmission about 200 telegrams per hour may be got off, but, he adds, the use of such an installation necessitates a continuous flow of messages. When there is a sufficiency the utilisation of the apparatus and staff is much better than when the number is small, consequently in order that the working may be advantageous it is essential that a sufficiency of traffic should always be available but, in all countries, the load is heavy during a few hours only. The German instrument reaches the high peak of its output for a few hours perhaps, but afterwards it employs more operators than a more modest machine would require for the disposal of the work. From this point of view our Baudot is greatly superior since there is always the possibility of opening or closing channels according as telegrams are on hand to send or to receive. The same German official has not confined his criticism to this aspect of the matter,

but adds this further objection that if, with this class of apparatus, an interruption of the line occurs so that it cannot be worked, a large number of telegrams, already punched before the cause and locality of the disturbance are determined, lie waiting transmission. It is thus necessary to divert them over other lines, and as the circuits, generally speaking, are not fitted with the same type of automatic machine, the messages have to be disposed of by hand, consequently the labour of punching is entirely lost and delay results. Moreover, to perforate a series of messages involves theoretically a certain amount of delay. It is necessary, before the first telegram can be sent off, to wait for four or five others, then the slip is ready to be put through the transmitter. The German telegraphic colossus of millions of signals has collapsed even in the presence of its own greatness. Its successor, infinitely more modest—a bad imitation of our Baudot that it was to supplant—is seen to possess very ordinary qualities, particularly lacking in adaptability to the rise and fall of traffic in a telegraph system. Foreign administrations will no more be taken in by the brilliant qualities of the second than by the showy, if deceitful, promises of the first invention. This apparatus designed and constructed to transmit 20,000 words an hour is like many other German conceptions and creations. To create 'big' harmonises with the characteristic national vanity which aims at astonishing the world by the power of its genius. To sum up it is all bluff—pure bluff."

Perhaps a brief comment in regard to the general tone of the article may be permitted.

It is evident that the writer is intensely chauvinistic and at the present time this feature is perhaps not very surprising, still one should not be stone blind to the merits even of an enemy invention. The Siemens can undoubtedly be adapted to the rise and fall of traffic, but instead of the opening and closing of channels the punching and gumming staff must of course be adjusted to the requirements.

Since the outbreak of war the instrument has suffered a partial eclipse and the good results obtained under pre-war conditions have not been possible.

In closing I should like to add that according to information imparted to me the honour or credit of the discovery of the five-unit principle belongs to Germany. Two eminent German scientists flourished about the middle of the nineteenth century, Gauss, a clever mathematician, and Weber, a distinguished physicist, and their theories appear to have been the source whence Baudot evolved the principles governing his fine instrument. It is, therefore, evident that M. Fournier is not in possession of *all* the facts.

J. B.

BELLTEL THE MYTH.

(With apologies to Mr. Jeffery Farnol.)

SAXON PERIOD.

Interior of primeval telephone exchange.

OPERATOR ... With whom wouldst thou hold converse, Honoured Sir?
(*answering call of subscriber*)

SUBSCRIBER ... To one whom men call Belltel, would I speak.
(*aside*) Methinks, if mem'ry serve, that is the name.

OP. ... The number of this Belltel knowest thou?

SUB. ... I know it not. He is of goodly mien,
Perchance too stout for hypercrite eye.
Some say too long he lingers in his cups,
But that methinks is wrongful calumny
Born of perverse and evil mind.
Dost recognise the man?

OP. ... Thou helpst me not,
Dost think I wear the image in my mind
Of each subscriber joined with this Exchange?

(*aside*) A case, methinks, for Overwench to deal.
(*aloud*) Art sure his dwelling lies within the linc
Which compasseth the beat of this Exchange?

SUB. ... He dwells, methinks, within the Spytals Field
Hard by My Lord of Halstanebury's Wood.

OP. ... At Spytals Field! By Holy Cuthbert's bones,
(*waxing sarcastic*) Distant from here ten times on arrow's flight.
Thou art, so people say, a man of note,
And travelled too, hast been to foreign shores.
Famed in discussion at the Witan's Mote,
In counsel crafty and of mind attuned,
And yet thou thinkest that far Spytals Field
Shall be within the beat of this Exchange.
Begone! Go to! Thou'rt ignorant of much,
Wrongly appraised by peasant and by clown.

SUB. ... Humbly thy pardon, Wench, I crave, 'tis true
Great is my ignorance of certain things.
Of current's marvel, and of magnet's power,
Of winding coils that multiply their strength,
Of switchboards and of other strange device
To join, unjoin, in listen, and out cut,
These things I know by hearsay and repute.
But of transmission's limit, naught know I.
Therefore knew not that far off Spytals Field
Came not within the beat of thine Exchange.
Thy pardon, Wench, and grant to me thine aid
Speech with this Belltel straightway to procure.

OP. (*relenting*) ... By line of junction may the deed be done.
(*Speaks to, and connects subscriber's line with, Overwench of Spytal Exchange.*)

OVERWENCH ... Speech with one Belltel is it that you crave?
(*to subscriber sharply*) Hast thou the name aright? To me 'tis sure
No Belltel have we in the list of names
Of citizens who us do tribute pay.
'Tis true one Bulltail was with us betimes,
But he paid not with promptitude the sums
Asked for from time to time by use and wont,
And so must needs we 'gainst him action take.
Pursued we him with mutt'rings and with threats,
At intervals which brief and more brief grew.
Such action proving not of full avail
From distribution's frame we straightway drew
Two strangely-fashioned coils on bobbins wound,
Thus from him taking all facility
Of holding converse—save at face to face,
An ancient method, slow and cumbersome.

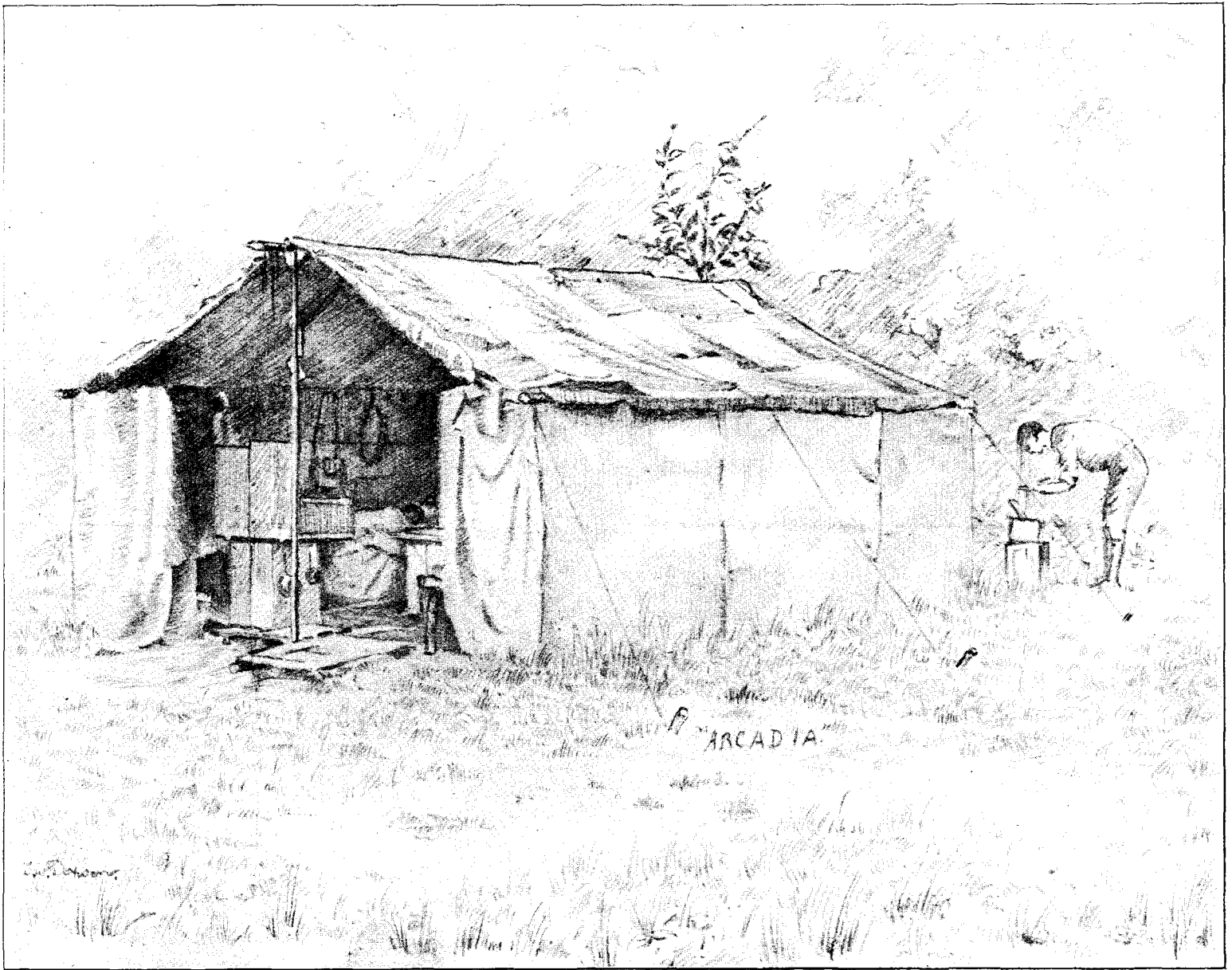
SUB. (*aside*) ... Methinks it had its points. (*aloud*) And how didst end
This tale of Bulltail? Did he make amends?

OVERWENCH ... E'en still in payment lagged he, and at last
We cancelled Bulltail's name from out the list
And made known far and wide the fellow's shame.
As Bulltail since is he no longer known,
But men as Bobtail now of him do speak.
(*laughing right merrily*) A merrie play on words which signifies
That he who bears the name is of no weight
But savoureth of flimsy rag and tag.
To such a pass indeed hath this thing come
That those who would a stroke of business make
With Bull—or Bobtail, as he's better known,
Are looked upon by men with eye askance—
Is this the churl with whom thou wouldst hold speech?

SUB. (*hastily*) ... No, no, fair Overwench, I am convinced
I would not dealings have with such as he,
I am the victim of some fantasy.
My Belltel is a Myth, existing not,
And yet the name was giv'n me by my wife,
Who wished from him to purchase goods of silk.
From Lady Margery got she the name,
Who trowed he traded in the Spytals Field.
(*testily*) A plague upon these women folk say I.
Their minds are fashioned but for scandal's store,
For other things their mem'ries are like tents
In which the sparrows fly, and out again,
Making but brief and quick-forgotten stay.
A name, or thought, or fact, or circumstance
For one brief space a woman's mind doth take,
Then out into the air is freely lost,
Except it be of scandal, then 'tis saved,
And memorised, and cherished for long time.
A plague upon—

OVERWENCH ... Wouldst thou contemn my sex?
Thou vulgar churlish addle-pated knave!
Thou scurrilous and low born lop-eared loon!
Then shalt thou make amends for thy base words.
I go to give instructions for thy linc
To be deprived of its coils. And so
For full seven days shalt thou no converse hold
With citizen with line to this Exchange
Unless thou go to speak him face to face
At cost and trouble to thyself and him.
Thus shalt thou learn more care to exercise
In use of thine unbridled lying tongue.
(*Disconnects.*)

C. W. MUIRHEAD.



A BRISTOL TELEGRAPHIST'S HOME IN FRANCE.

(Drawn by Sapper F. Dorson.)

TELEPHONES TO ALL PARTS.

COMMUNICATION being as urgent as transport, the Royal Engineers have seen to it that the large area of Northern and North-West France in which our Armies are operating has been linked up by a telephonic system unique. It is no mere collection of temporary wires strung from tree to tree. The poles and wires are in every way as good as those of the Post Office at home. The installation might indeed be thought to be extravagant, but cheap telephoning is notoriously bad telephoning. A breakdown of communications which might be caused by the fierce wind and electric storms which have happened so frequently in the war might spell a great inconvenience or even worse. An indistinct telephone is useless. And so, marching with the Army, and linking up a thousand essential points, is a telephone service that cannot be bettered. To-day it would be quite possible for the Commander-in-Chief, if he so desired to call up London from beyond Fricourt, for our wires are already in places where we saw them burying the blackened corpses of dead Germans, and where the sound of great guns makes it sometimes necessary to shout in order to make oneself heard in a conversation.

Every officer or head of department of importance in the British zone has a telephone at his hand, so that he may give and receive orders, not absolutely secret, by the quickest and most popular means of communication. Where necessary, the English telephones are linked up with the trunk lines of the French Government, for which purposes interpreters are placed in the exchanges. The speed of communication is remarkable. It varies, of course, with the amount of business, but I have seen a man call up Paris, London, and the seaport bases in France all within an hour.

Supplementing the telephonic system is a telegraphic link, and there is also the wireless. The Army Signal Corps is to be congratulated on a fine achievement. Over and above these there are the motor dispatch riders, some of whose experiences during the war have been as thrilling as those of our air boys. The noisy nuisance of our peace time roads at home has been a prime factor in the prompt waging of war. Motor cycles and portable telephones appear in the most out of the way spots. Far beyond Fricourt I met these cyclists making their way in and out and around the shell holes.—Lord Northcliffe in *The Times*.

CABLES

AND

WIRES

OF

EVERY

DESCRIPTION.

TELEGRAPHS

AND

TELEPHONES.

SIGNALLING

APPARATUS

FOR

RAILWAYS, MINES, SHIPS

AND

POWER STATIONS.

SIEMENS

PRIMARY

BATTERIES:

FLUID

AND

DRY.

MATERIAL

FOR

OVERHEAD

LINES.

SIEMENS BROTHERS & CO., LTD., WOOLWICH, LONDON, S.E.

Telephone. CITY 6400 (7 lines).

Telegrams: "SIEMENS, WOOLWICH."

Home Branches.

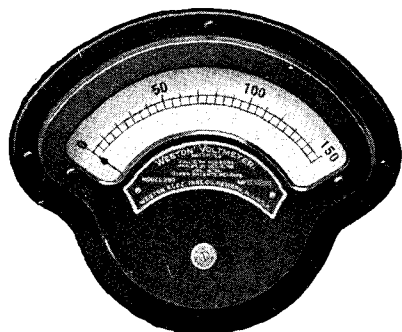
BIRMINGHAM—Central House, New Street.
BRISTOL—30, Bridge Street.
CARDIFF—89, St. Mary Street.
GLASGOW—66, Waterloo Street.
MANCHESTER—196, Deansgate.
NEWCASTLE-ON-TYNE—64-68, Collingwood Buildings.
SHEFFIELD—22, High Street.
SOUTHAMPTON—46, High Street.

Indian and Colonial Branches.

CALCUTTA—Clive Buildings, Clive Street.
BOMBAY—Rampart Row.
MADRAS—Smith's Corner, Mount Road.
SINGAPORE—1, 2, 6 & 9, Winchester House.
CAPE TOWN—Norwich Union Buildings,
St. George's Street.
SYDNEY—42, Bridge Street.
MELBOURNE—Dominion Chambers, 59-61, William
Street.
WELLINGTON (N.Z.)—A. & T. Burt, Ltd.,
Courtenay Place.
DUNEDIN (N.Z.)—A. & T. Burt, Ltd., Stuart St.
AUCKLAND (N.Z.)—A. & T. Burt, Ltd., Customs
Street West.

WESTON

Miniature Precision D.C. Instruments



MODEL 267 SWITCHBOARD VOLTMETER.

This series of Miniature Switchboard Instruments comprises Voltmeters, Ammeters and Mil-Ammeters.
Overall dimensions, $4\frac{1}{4}'' \times 3\frac{1}{8}''$

DELIVERY FROM STOCK.

WRITE FOR LIST D3.

WESTON ELECTRICAL INSTRUMENT CO.

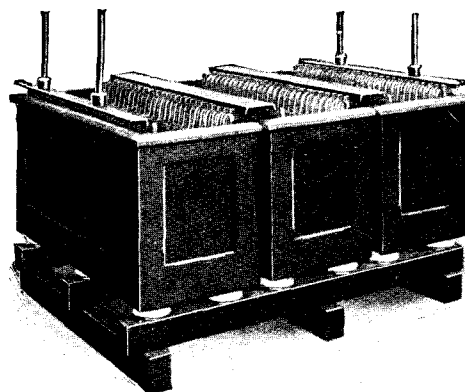
AUDREY HOUSE, ELY PLACE, HOLBORN, E.C.

Telephone: 2029 HOLBORN. Telegrams & Cables: "PIVOTED, LONDON."

HART ACCUMULATOR

CO., LTD.

Hart Storage Cells are **BRITISH MADE** and are in use throughout the world for all purposes.



Many thousands of Cells in constant service for Telephone, Telegraph and Wireless Installations.

SPECIAL TYPES of HIGH DISCHARGE CELLS FOR TELEPHONE EXCHANGES.

PRICE LIST ON APPLICATION.

STRATFORD, LONDON, ENG.

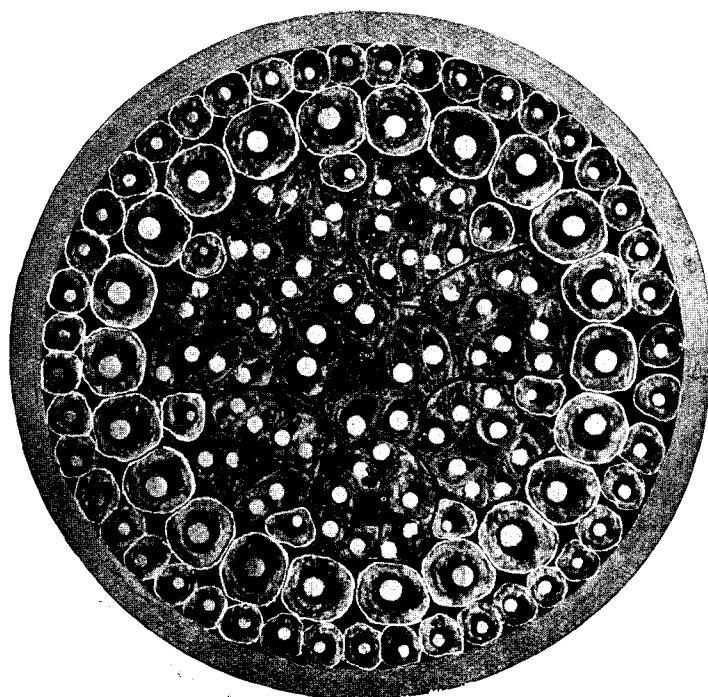
DRY CORE TELEPHONE CABLES.

*Electrical Plant of every description
for Power, Lighting, and Wireless
Installations.*

JOHNSON & PHILLIPS L^{td}

CHARLTON, LONDON, S.E.

ESTABLISHED 1875.



TELEGRAPH LEGISLATION IN THE UNITED STATES OF AMERICA.

(From the *Journal Télégraphique*.)

IN view of the enormous development of the Telegraph and Telephone Services in the United States of America, the Bureau Internationale has asked the Western Union Telegraph Company to furnish it with a summary of the regulations governing it. We give a summary of the information which that company has furnished in response to the questions which we submitted to them to facilitate the task of the Bureau.

I.—General Arrangements.

Having regard to the Federal system of government which exists in the United States, the laws applicable to telegraphy are for the most part the laws of the various States; it cannot therefore be expected that they should be of a uniform character.

According to the Constitution, the Federal Government cannot in telegraphic matters pass laws applicable to the whole of the States, except in so far as that faculty proceeds from its constitutional right to establish post offices and postal routes and to regulate relations with foreign States and between the different States of the Union. Each State establishes its own telegraphic legislation. Without going into great detail therefore, one can only give a *resumé* of the principal arrangements in force.

II.—Monopoly.

The right of organising and working a telegraph system is accorded to any company which fulfils the prescribed formalities—but without exclusive monopoly.

III.—Establishment of Lines.

Most States give the companies the right of expropriation (wayleave rights). A small number of them have no rules on the subject. Finally, some States accord the right of expropriation to companies formed under the laws of other States, subject to certain restrictions and conditions.

IV.—Protection of Lines.

Many States have passed laws to the effect that wilful damage to a telegraph line shall be considered as a criminal or felonious act according to circumstances. Where no special laws exist on the subject, all malicious attempts on a telegraph line can be repressed under the penal laws of the State relative to the protection of property.

V.—Treatment of Telegraphic Correspondence and Telephone Messages.

Telegraph and telephone companies in the United States are generally treated as ordinary enterprises for public transport and considered as analogous to such enterprises. They are not permitted to establish, without reason, any distinction between persons with whom they have relations: they must serve everyone in the same manner, as a railway company must carry all those who desire to travel; they may, however, refuse to transmit telegrams which contain indecent or offensive language or which favour or incite to crime.

The Government of the United States has, in virtue of its power of establishing post offices and postal routes, adopted a law known as the "Act of July 24, 1866, Title 65. Section 5,263 *et seq*, Revised Statute of the United States." This law confers certain privileges on all companies which have declared in writing to the Postmaster-General their willingness to conform to the said law. In exchange for these privileges the telegraph companies in question are obliged to transmit the telegrams of the United States Government at a special tariff and to accord them priority over all other communications. Some States have reserved priority of transmission for their official telegrams; such arrangements, however, are not applicable to telegrams passing the frontiers of the respective States.

The laws ordinarily do not contain any arrangements concerning the identification of the sender or the verification of his signature. It is generally admitted that in the absence of serious motives for suspecting the good faith of the sender, it is the duty of the telegraph company to accept and transmit telegrams without other information, even when neither they or their agents know him personally.

It is universally recognised that telegrams are of a secret and confidential nature and that the company may not reveal their contents, except with the consent of the interested party, or in response to the request of a judicial authority. It may also in certain cases be obliged to produce telegrams in a court of justice. Some States have adopted laws requiring the disclosure to State officials under certain conditions of the contents of telegrams which appear to have been sent with criminal intent, or in order to favour the accomplishment of crime, but in general, the States do not reserve the right of controlling telegrams of any kind whatsoever, or to suppress their transmission. Nevertheless, it is certain that the Federal Government could use this right in times of war. On the other hand, no law particularly specifies the crimes or misdemeanours which might be committed by means of the telegraph or telephone. Such crimes or misdemeanours are treated in each particular case according to the ordinary course of the law concerning them.

VI.—Responsibility of the Licensees of Telegraph or Telephone Lines.

This question is so complex by reason of the great disparity which exists between the laws of the different States, that it is hardly possible to give even a summary of the arrangements concerning it. It may, however, be said that in general the telegraph companies are responsible for the consequences of their negligence; they are not considered as guarantors nor liable to the entire responsibility of an ordinary transport company. However, if by their negligence, damage results to the persons with whom they contract, or to persons for whom the telegrams are destined they are generally responsible, at least so far as these damages can be considered attributable to the negligence of the telegraph company. In some States the companies are authorised to limit their responsibility by conditions printed on the telegraph forms; however, these limitations are generally considered as not valid. Generally it is admitted that the telegraph companies may make reasonable regulations for the management of their affairs and the protection of their interests, but not for the limitation of their responsibility in case of negligence. Thus, for example, rules fixing the hours during which the offices are open, the distance to which each office delivers telegrams without extra charge, the period of delay within which claims for damage may be presented, &c. In a small number of States the telegraph companies are subject to penalties for delays in the transmission or forwarding of their telegrams.

DISTRIBUTION OF PRIZES TO GIRL PROBATIONERS AT THE LONDON TELEPHONE SERVICE.

A pleasant little departure from the bounds of ordinary official life was made recently in the London Telephone Service, when prizes were presented to girl probationers who attend the educational classes held at Queen Victoria Street.

Under the conditions of their employment, girl probationers are required to devote a certain part of their time, apart from their official duties, to study, and so fit themselves for the more advanced positions in the Service which they hope to attain later. Classes are arranged for them which are specially adapted to meet the requirements of the Civil Service Examinations, and the girls employed in the Head Office of the London Telephone Service are particularly fortunate in being able to attend classes held in the building where they work, as they are saved the necessity of additional travelling and are able to return to their homes at a comparatively early hour.

The informal little ceremony held at Queen Victoria Street testified to the interest taken in the girls' progress by the authorities of the Department. The prizes were distributed by the Controller, and there were present with him the Deputy-Controller, who is also the Chairman of the Board of School Managers, and the Lady Superintendent. The Controller encouraged the girls to persevere with their studies, and emphasized the necessity for mental training and the benefits they would feel from it in future years. He congratulated each prize winner, and expressed the hope that the prospect of gaining such prizes as those he had given them would act as an additional incentive to keenness and effort amongst their fellow-students.

The Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising	{	MR. JOHN LEE.
Committee - -	{	MR. J. W. WISSENDEN.
Managing Editor -		MR. W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications, together with photographs, diagrams, or other illustrations, should be addressed to him at G.P.O. North, London, E.C. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.

VOL. II.]

SEPTEMBER, 1916.

[No. 24.]

A GLORIFIED POST OFFICE.

THE newspaper cuttings of 1913 form interesting reading to-day. Then we were told, with more or less fierceness of language, that the Post Office was a "petrified institution," "bound in red tape," "governed by officials who were lacking in expert knowledge." It could not manage telephone business. Indeed before telephone business was under its control a month, life in the suburbs became intolerable. Social gatherings became marked by quotations from the *Daily Mail*. Kindly churchwardens recounted experiences with telephone calls which jeopardised their fitness for ecclesiastical office. Gentlemen who had never heard of the Port of London Authority suddenly developed a warm admiration for the suitability of that body as a novel means of controlling telephone enterprise. American newspapers raised their readers' hair—and ire—by amazing accounts of ambassadors and journalists waiting hours in call boxes for calls, exchanging international courtesies with operators, and, finally, having themselves in their own persons to "run around." Things grew from bad to worse and by leafy June (judging by the cuttings) no one succeeded in getting a telephone call at all. The music halls took the matter up and at least one play directed its point (if plays have points) against the Postmaster-General. It was a sorry time. Those of us who had some connexion with the business hung our heads in shame, feeling that fingers of scorn were pointed at us. Genial friends suggested Norway and Sweden for holidays; business enthusiasts told us that the telephone business could not be conducted without an unlimited power for "sacking on the spot"; members of the House of Commons, armed with newspaper extracts, assured the Postmaster-General that he was giving "the worst service in Europe." (Applause.)

The applause has died down. Even the House of Commons knows

something more about Europe. The Post Office has regained something of general esteem, and certain newspapers, who came to scoff, remained to admire. But the Fabian Research Department (under the leadership of Mr. Sidney Webb) draws from us the softest of blushes. If only we had known in 1913 that in the heart of the Fabian Research Department there was a scheme for giving the Post Office a far wider responsibility than any one had dreamed of claiming for it, we might have spent a few happier evenings. Here is a volume *How to Pay for the War*, which tells the world how the Post Office could undertake a vast number of new services for the public good and double its profit! The suggestions are wide in their scope; certainly they are put forward with a daring which has little hesitation or halting as to their feasibility. There are to be new letter services, a greater use of automatic machines, beautiful new offices on prominent sites ("more telegrams will be sent"), all sorts of wonderful messenger services, newspaper deliveries in country places, extensions of the parcel post, collect-on-delivery devices, a gorgeous extension of Post Office banking, with postal cheques and special arrangements for the payment of wages by bank accounts, a vast development in the form of a letter of credit and circular note system, a debt collecting system on a large scale, a sort of universal stock broker, "increased activity in obtaining deposits," a reformed foreign money order system, newspaper and library arrangements (a Mudie everywhere).

There is the scheme in outline. It is curiously negligent of telegraphs and telephones. It hints at "more telegrams," as we have seen, but these are to result from improved architecture and better sites. That is about all. The Research Department says: "We suppress, from lack of space, a vision of the possible expansion of the telegraph and telephone." We make Mr. Sidney Webb what is called, in the poetic business of the world, a firm offer. What would we not give for that exhilarating vision? We shall gladly find room for it. If it happens to be as thrilling as the visions of the omnipresent Mudie, and the peasant's cheque book, and the "Post Office as the Common Remittance Market of the World," we shall be content. But we would suggest that even a vision should give honour where honour is due. This book says that local advisory committees should be appointed "having, as their main duty, the discussion of any alleged shortcomings in the local services of the Post Office." The advantage of such an organisation is "conceded" by the Telephone and Telegraph Advisory Committees. But who invented the advisory committee idea?

The book is most valuable and if we seem to take it with insufficient seriousness we must not be blamed. Gladly would we have examined the telegraph and telephone vision, but it was not vouchsafed to us. One quotation we make, without comment, because it shows an inclination to an economic doctrine which, at the moment, is in the air. "Promotion should not depend on the will of any one superior, but be given always on the advice of a council of superiors, to which, in order to give confidence in the exclusion of favouritism and the elimination of any approach to victimisation, it is advisable that (as in the service of the French State Railways) representatives of the subordinate grades should be admitted. Moreover, in order both to encourage initiative and to satisfy as far as practicable the legitimate aspiration of

employees of all grades for some measure of participation in the control over their own working lives, it would be very desirable to institute, on the model of the French State Railway Service, a series of Councils of Management. . . . Such councils should be composed not only of the responsible officials, local or central, but should certainly include also representatives of the lower grades of the official hierarchy, whose participation in the deliberations is essential, both as a means of encouraging initiative and intellectual interest, and as a method of enabling all grades of the service to share, if only to a small extent, in the administration of the service of which they form a part." We offered to quote this without comment, but we will venture one remark: This is a very different story from the shrill cries of 1913, the purport of which was that the Post Office had no powers of discipline over its staff.

THE CHANNEL TUNNEL.

IN the early stages of the war a military pundit in *The Times* expressed himself as follows:—"Let us, however, be grateful for one mercy. The international financiers, doctrinaires and lunatics who wished to fit us out with a Channel Tunnel are silenced for good and all." This deliverance reads less like a prophecy than a statement of fact, and what it lacks in polish it makes up in that vigour dear to the heart of the controversialist who sees only his own side of the case. The mere civilian imagines that a Channel Tunnel in being would have been, somehow, rather useful in the transport of troops and stores to France, and in his confidence in the military and engineering prowess of his countrymen would feel sorry for any foreign army which hazarded the passage of the tunnel. Later experience too has shown that even the futile Zeppelin would have a better chance to dump a few Germans on these shores than would the Channel Tunnel. We wonder whether the military correspondent has changed his opinion during the last two years. More probably it is of the nature of a "fixed idea." We wonder also in which of his three categories he would place Professor Fleming, whose recent letter to *The Times* we reprint in another column. In this interesting communication, which will appeal strongly to all telegraphists and telephonists, attention is drawn, for the first time we believe, to the increased facilities which the Channel Tunnel will afford for direct telephonic communication between England and the Continent. All the disadvantages of submarine cables would at once be removed, and a fair prospect of some of the triumphs of long distance telephony achieved in the United States would be opened out. Owing to the recognised drawbacks of submarine telephony, long distance communication between this country and foreign lands has naturally been much restricted. Whilst before the war Berlin, for example, was in telephonic touch with Rome, Vienna, Buda Pest, Stockholm, Copenhagen and of course with the principal towns in France, Belgium and Holland, Great Britain was only in communication with France and Belgium and two or three towns in Switzerland. A cable was under construction to afford connexion with Holland, but this was the limit of development in the immediate future.

The Channel Tunnel scheme, with its immense possibilities, is happily to the fore again; it is the natural outcome of the cordial relations between the Western Powers which have been cemented by blood and suffering. It is one of the inevitable concomitants of the return to normal life and the re-organisation of Europe after the mad fever of war. The jocular person has hitherto seen in the Channel Tunnel chiefly a way of escape from an hour's sea sickness at the cost of making this island a peninsula. In such a concept of a "peninsula" lies the real joke, if the jocular person could be brought to see it. But this type of humorist, who is generally unconsciously reactionary, is, like the poor, always with us. To him, as to the poor, amelioration is perhaps on the way, and he will live to see in the Channel Tunnel a long-deferred step in the progress of civilisation and in the beneficent intercourse of nations.

HIC ET UBIQUE.

THE present issue marks the conclusion of the second volume of the TELEGRAPH AND TELEPHONE JOURNAL. With the constant drain on the staff due to enlistment, some decrease in the circulation was inevitable, but we gather much encouragement from the interest which is nevertheless maintained in the JOURNAL, and see every prospect of exceeding our original satisfactory circulation when normal conditions are resumed. The sales in the Colonies and in neutral countries are meanwhile increasing. We get many appreciative letters from readers who are serving with the colours, and are glad to think that they find in the JOURNAL a convenient means for keeping in touch with their old life and colleagues.

THE following letter to *The Times*, headed "The Utilities of a Channel Tunnel," upon which we comment in our editorial column, presents we think one more strong argument in favour of that much-debated and oft-rejected scheme:—

Sir,—One of the possible utilities of a Franco-British Channel tunnel, which has not yet, I believe, been mentioned, is the increased facility it would afford for direct telephonic communication between Great Britain, France, Switzerland, and Italy. There are at present two English Channel telephone cables, each with twin circuits, which, by the method of usage called phantomising, can be made equivalent to three circuits each. These cables are, of course, subject to the possibility of injury, like all submarine cables, and repairs might be costly and take time. If, however, the Channel tunnel were constructed with proper provision for it, a large number of telephonic and telegraphic cables of a certain type could be laid in it which would afford greatly increased means of intercommunication at a less cost than by equivalent submarine cables. If these were extended by suitable coil-loaded aerial lines, telephonic communication could be established between the principal cities in Great Britain and those in France, and possibly Italy. Having regard to the far closer commercial relations which will exist between the Allies in the post-war period, this improved intercommunication will be of the greatest advantage.

I submit, therefore, that in any plans for such a tunnel ample provision should be made for telephonic and telegraphic cables of the latest type for long-distance working.

I am, etc.,
J. A. FLEMING.

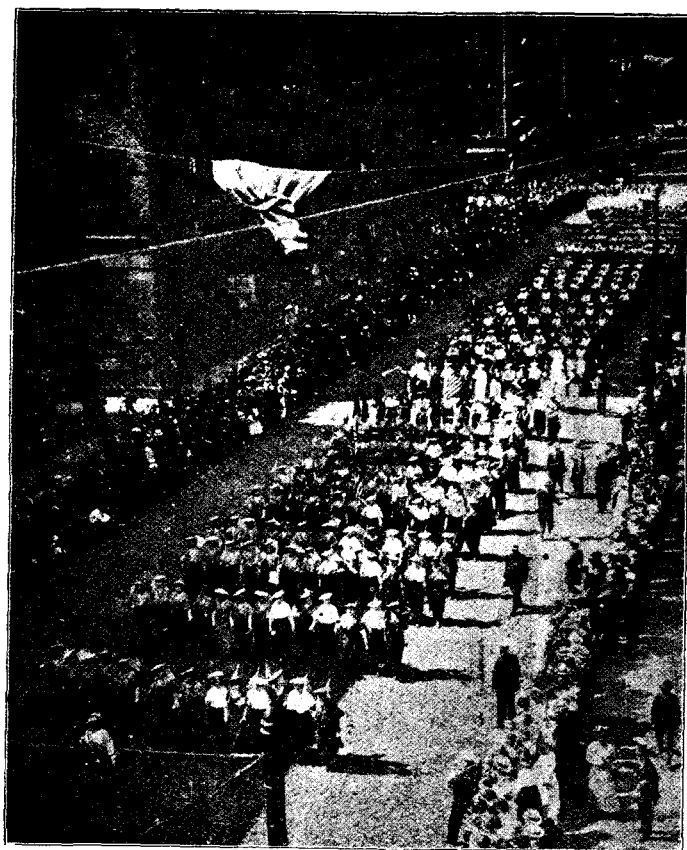
University College, London.

THE District Manager, Liverpool, in sending us the following letter remarks that the problems which the public at times set the Postal branch seem likely to spread to other branches. The communication seems to us to show the pitfalls which the English alphabet presents to those who try to wrestle with phonetic spelling:—

Dear Sir,

Pleaz send me ful partikyularz ov the telefoen survis with deetailz ov the vaiarius moedz ov charjing for the yues ov a telefoen. I am aukredi a subserieber in Liverpool.

Yurz truulli,



WE reproduce from the *Telephone Engineer*, Chicago, a striking picture of a march past of telephone operators who took part in a great "Preparedness Parade" in Chicago recently. The total number of telephone employees who marched in the two sections of the staff of the Chicago Telephone Company numbered 6,400.

THE same number of the *Telephone Engineer* has an editorial headed "What the Newspapers Haven't Learned," remarking that although newspaper men depend upon the telephone for the quick transmission of all but its most important news, they are seemingly not yet cognisant of the fact that the telephone is larger than the telegraph. The great Bell combination, it is said, is frequently referred to as "the telegraph company," and the company's shares are still quoted as "telegraph stock." Apparently these writers, it adds, regard the telephone as a side line, an ingenious device arranged to use the telegraph wires (during idle moments) for the curious and interesting transmission of the human voice.

This protest comes all the more strangely from America where the telephone bulks so largely in public and private life.

IN his article on the Post Office which has been converted into a tavern, Mr. Baxter does not mention that part of the building is still retained for post office work. The Telegraph Department remains surrounded, as it were, by diverse and inviting beverages. Whether they were considered the fittest of all departments to pass unscathed through the fires of temptation (if we may use a somewhat inappropriate simile) we are not informed.

THERE are even people in whose sight the Stockholm telephone service is not perfect. Mr. J. D. Barry, a journalist, who was a member of the Ford Peace party, writes of it as follows in the San Francisco newspapers:—"The fact remains, and it is borne out by the experience of others besides myself, including natives, that there are times when the telephone here seems to go on strike. The system is not nearly so reliable as our own. Connexions are more uncertain."

TELEGRAPHIC MEMORABILIA.

REFERENCE has been made in the pages of the TELEPHONE AND TELEGRAPH JOURNAL and in the pages of other Service organs to the "literature of the trenches." Occasional interesting excerpts have been given of these, sometimes, rough-and-ready but not infrequently brilliant efforts which the cheerful, yet thoughtful, pens of our men at the front have produced. Hope has also been expressed that someone would collect specimens of these ephemeral magazines and booklets. A perusal of the autumn publishers' lists now reveals the welcome fact that Sir Frederick Treves and George Goodchild are jointly editing a book which is to bear the simple title of *Made in the Trenches*, and is to be composed "entirely of contributions by men serving with the colours." This interesting anthology of stories, articles, anecdotes and pen sketches should give a worthy permanency to these much-to-be-treasured scribbblings. It would be surprising if certain specimens solely due to Post Office authorship did not form a small corner in the volume.

Reference has also been made, and will doubtless continue to be made, to the curious errors which have from time to time crept into telegrams, more especially during this stressful war-period. Fortunately the bulk of these do not pass beyond the portals of Post Office premises, and the British public is thus prevented the irritation of not always appreciating the joke. Of such a type was the message, aided be it said by the caligraphy of the sender, which announced: "Coming to-day with fowls. Obtain worms on approval." Enquiries resulted in a B Q. "For worms read rooms!" One's kindly thoughts towards the sender and his apparent solicitude for the exact diet of his charge thus received the rudest of shocks, being converted into the sure and certain knowledge of a more selfish desire for personal comfort on his own part!

The lighter side apart, the question has been repeatedly asked: "Is the Post Office the only telegraph institution in this country guilty in respect of errors of this and, or, other types?" Assuredly the genius telegraphist is not infallible when he becomes a company's man. Then what is the proportion of undetected errors in the companies' and in the Government Departments respectively? Figures here would surely prove interesting, but do not appear to be readily forthcoming. It is stated that one company which has much to do with machine telegraphy declares the proportion to be 1 per 10,000. Whether this be 1 undetected error in 10,000 words or 1 in 10,000 telegrams is not clear. Whichever it may be, experience of certain particular and important types of telegram would appear to warrant a very heavy discount on these figures.

On the whole one should be well prepared to find the proportion higher in the Post Office service than in that of the cable companies for very simple reasons. In the Government service the grades of traffic dealt with are spread over a wider range than in the cable companies, where the service is generally very highly specialised and the staff more highly paid than is the average Government operator. Under the Government regime it is merely to quote the conditions of service to state that the quality and standard of many of the operators is far below that acceptable by any of the private corporations. Let it be said at once that from the very nature of the services demanded by the public on behalf of almost the remotest village and hamlet of the United Kingdom, no other quality could be provided than something less than first class! Visits to sundry "grocers'" Post Offices, or experience at the more business end of the wires serving the same, render any further argument on the question superfluous.

There is, however, the other side to this matter, and that is the injustice suffered by the thousands of Government operators who are second to none in the whole telegraphic world for their skill and ability, and who, given the opportunity, would excel in any branch of their craft. These men, and be it said women also, feel most acutely any reflection upon their efficiency as a class and any attempt at belittling the quality of the services rendered. If I were to state that a badly turned out telegram to such as these is a positive pain, I should probably be laughed

Gell Telegraphic Appliances Syndicate, Limited.

ON WAR OFFICE, ADMIRALTY, POST OFFICE, CROWN
AGENTS, AND OTHER COLONIAL ADMINISTRATIONS
LISTS OF CONTRACTORS.

SOLE MANUFACTURERS OF THE

GELL KEYBOARD PERFORATOR.

GELL Motor - Driven Transmitter.

GELL Motor - Driven Receiver

for Morse and Cable Wheatstone working.

Also Manufacturers of

**LANDLINE, CABLE AND WIRELESS
TELEGRAPHIC APPARATUS.**

Registered Offices:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Sardinia House, Sardinia Street, Kingsway, W.C.
Telephone: Holborn 6826.

Works:

GELL TELEGRAPHIC APPLIANCES SYNDICATE, LIMITED,
Pine Grove Works, Tollington Park, London, N.
Telephone: North 1196. Telegrams: "Gelltas, London."

EBONITE.

TONS of **SHEET, ROD and TUBING** in London
Stock in various Qualities and numerous Sizes.

EBONITE-VULCANITE owing to its special nature,
can only be made **successfully** after many years of experience.

We have been manufacturing this Material for
OVER 60 YEARS.

AMERICAN HARD RUBBER CO.,

13a, FORE STREET, LONDON, E.C.

"EBONITE, LONDON."

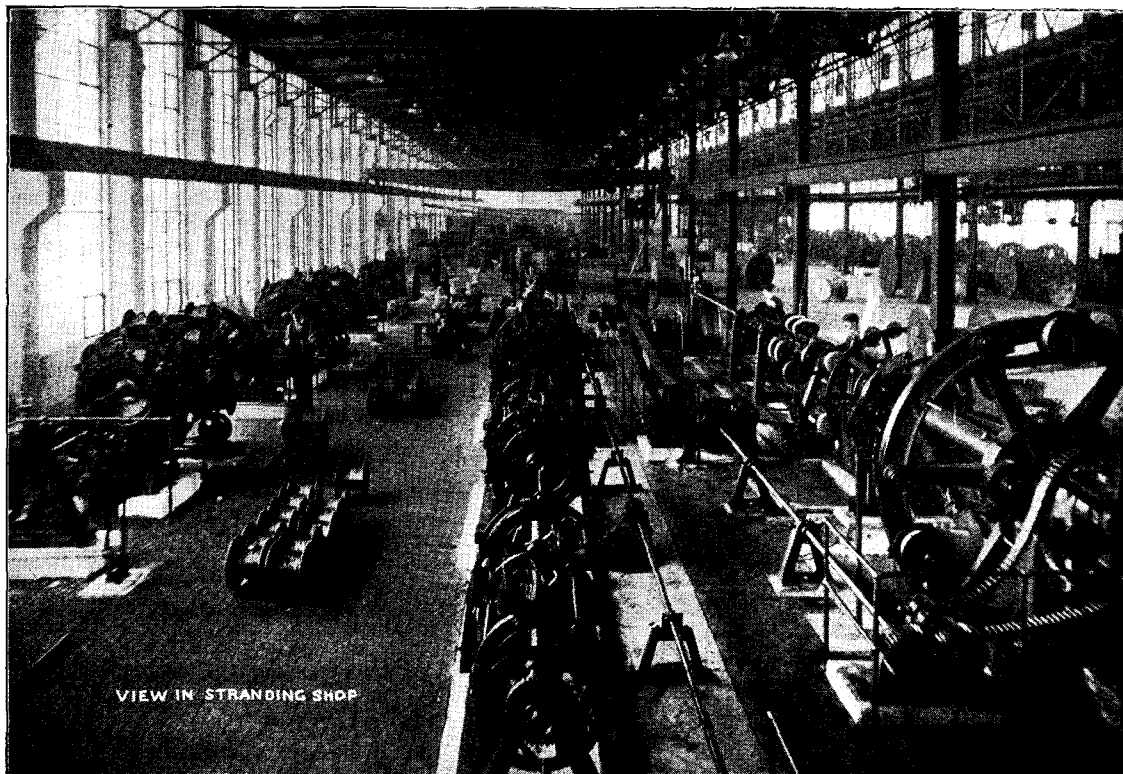
Head Office: 9-13, MERCER STREET, NEW YORK, U.S.A.

Factories: Akron, Ohio. Butler, New Jersey. College Point, New York.

Silk and Cotton-Covered H.C. Copper Wire,
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.
79, Clerkenwell Road, London, E.C.
13259 CENTRAL.
"ORMISTON, LONDON."

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.



VIEW IN STRANDING SHOP

Electric Cables

Insulated with

Impregnated Paper,
Vulcanised Bitumen,
Vulcanised Rubber,
Paper and Dry Air.

Suitable for

Lighting,
Power,
Telephony,
Telegraphy, &c.

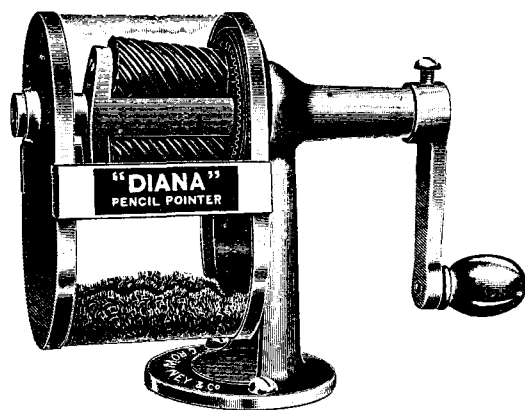
THE UNION CABLE CO. LTD.,

Telegrams: "CABLEWELL, DAGENHAM."
Telephone: RAINHAM 25 & 26.

DAGENHAM DOCK ESSEX.

GEORGE ROWNEY & CO.'s "DIANA" Pencil Sharpener.

A MACHINE—NOT A TOY.



Selling Price **7/6** each net.

GEORGE ROWNEY & CO.
ARTISTS' COLOURMEN AND
PENCIL MAKERS.
(RETAIL)
(COLOUR FACTORY)
(PENCIL FACTORY)

GERRARD 4893
Western - 2600
City - - 7823
Hampstead 2681

Head Office:
10 11, PERCY STREET.
61, Brompton Rd., S.W.
10, Diana Place, N.W.
Malden Crescent, N.W.

CARE OF THE EYES.

THE EASTERN OPTICAL CO.

(Principal - M. SAMMES).

2, 3, & 4, Workman's Hall Buildings, Romford Rd., Stratford, E.

Telephone: 177 STRATFORD.

HOURS OF ATTENDANCE: 10.30 A.M. TO 8 P.M. THURSDAYS, 10.30 A.M. TO 1 P.M.

City Depot.—152, 154, and 156, CITY ROAD.

(Adjoining Moorfields Eye Hospital).

Telephone: 1309 LONDON WALL.

HOURS OF ATTENDANCE: 9 A.M. TO 8 P.M. SATURDAYS, 9 A.M. TO 1 P.M.

Clapham Depot.—96, ST. JOHN'S ROAD, CLAPHAM JUNCTION.

Telephone: 3033 BATTERSEA.

HOURS OF ATTENDANCE: 9.30 A.M. TO 8 P.M. WEDNESDAYS, 9.30 A.M. TO 1 P.M.

Ophthalmic Opticians by Appointment to Hospitals, Doctors, Public Institutions, &c.

MAKERS TO:—The London County Council; The Metropolitan Hospital Sunday Fund, Mansion House, E.C.; The Salvation Army; and numerous other Institutions, London and Provincial.

LOCAL APPOINTMENTS:—The West Ham and Eastern General Hospital; The West Ham, East Ham, Leyton and Leytonstone School Children's Hospital Fund; West Ham Guardian; West Ham and East Ham Education Committees; The Infant Orphan Asylum, Wanstead; Mansfield House Settlement, &c.

AS TO OUR ABILITIES WE REFER YOU TO OUR APPOINTMENTS.

The Glasses we supply to Hospital Patients are the best modern Science can produce, and in no case exceed 3/6, in Steel Frames.

ARTIFICIAL EYES FITTED FROM STOCK OR MADE TO ORDER 3s. 6d. NO EXTRAS.

SPECIAL TARIFF TO CIVIL SERVANTS.

Spectacles or Pince-nez in steel or solid nickel frames, with sphere or compound Lenses	PER PAIR.
	s. d.
	3 6
Spectacles or Pince-nez with sphere or compound lenses in 10-year gold-filled frames	7 6

MADE TO OCULISTS' OR HOSPITAL PRESCRIPTION INCLUDING A GOOD SERVICEABLE CASE, WE HAVE ALWAYS IN ATTENDANCE A FULLY QUALIFIED REFRACTIONIST TO TEST AND ADVISE YOU, FREE OF CHARGE.

SYNCHRONOUS and other MULTIPLE TELEGRAPHS.

By ALBERT CUSHING CREHORE.

124 pp., 6 × 9, 42 illustrations.

Price 8/4 net.

PART I.—Methods of Obtaining Independent Telegraph Circuits by the use of Direct and Alternating Currents on the same Wire. Introduction. CHAPTER I.—Receiving Apparatus in the Duplex-Duplex System. II.—Transmitting Apparatus in the Duplex-Duplex System. III.—Applications of the Duplex-Duplex System. IV.—Alternating and Direct-current Quadruplex. V.—Low-Frequency Duplex-Duplex. PART II.—Methods of Obtaining Synchronism at Distant Points. Introduction. CHAPTER VI.—The Operation of Synchronous Motors on Wires which are Used for no other purpose. VII.—The Operation of Synchronous Motors on Wires which are also used for Telegraphs. PART III.—Synchronous Telegraphs. Introduction. CHAPTER VIII.—Measurements in Synchronous Telegraph Circuits. IX.—Explanation of the Measurements. X.—Different Conditions of Instruments and Line Leakage. XI.—Working in Opposite Directions on the Same Line. XII. Morse Circuits: General Consideration and Particular Systems. Index.

Have you seen AMERICAN TELEGRAPH PRACTICE.

By D. McNICOL.

Electricity and Magnetism in Telephone Maintenance.

By G. W. CUMMINGS

(Instructor of Inspectors, Chicago Telephone Co.)

140 pages, 5 × 8, 45 illustrations.

6 3 net.

WRITE FOR OUR T.T. CATALOGUE.

HILL PUBLISHING CO. LTD.

6 & 8, BOUVERIE STREET, LONDON, E.C.

STANDARD TECHNICAL WORKS

AUTOMATIC TELEPHONY. An excellent description of the Strowger Automatic System as adopted by the G.P.O. By S. TURNER, E.-in-C.'s Office. 32 pp., illustrated. 7d. net, post free.

TELEPHONE TROUBLES, AND HOW TO FIND THEM. On both the Magneto and O.B. Systems. Sixteenth Edition. 7d. net, post free.

THE TELEGRAPHISTS' AND TELEPHONISTS' NOTE BOOK. Third Edn. Highly spoken of by leading P.O. officials. 1s. 7d. post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY.

FINAL EXAMS., 1906-15. By H. P. Few, Silver Medallist.

An invaluable work, recommended by the leading technical journals. Limp Cloth, 8vo., 1s. 8d. net, post free.

THE TELEGRAPHISTS' GUIDE. By BELL and WILSON. The best work of its kind. For teachers and students alike it is invaluable, and the repeated calls for fresh editions prove its merit.

Sixteenth thousand. 2s. net, or 2s. 3d. post free.

TECHNICAL TELEGRAPHY. By ROBERTS and BURROWS. Fifth Edition. Contains an exhaustive selection of questions and model answers in all grades of the C. and G. exams. 2s. net, 2s. 2d. post free.

THE TELEGRAPHIST'S TECHNICAL VADE-MECUM. Being Notes for Students preparing for the C. & G. Grade I. Exam. in Telegraphy and Telephony. By F. TERREY, Honoursman. 8vo, 80 pp., 2s. 2d. net, post free.

QUESTIONS & SOLUTIONS IN TELEGRAPHY & TELEPHONY. By H. P. Few. Includes model solutions to the C. and G. exams. 1904-1914, as well as to several typical questions set at the Post Office Departmental exams. for Overseerships. Fourth edition. Cloth. 230 pages, 172 illustrations. 2s. 6d. net, or 2s. 9d. post free.

NOTES ON TELEGRAPHY. By G. MOGG. A simple exposition of the rudiments of technical telegraphy and telephony. Specially designed to meet the requirements of the C. and G. Ordinary Examinations. 2s. 6d. net, or 2s. 9d. post free.

ABC OF THE TELEPHONE. A Practical Treatise for all who are interested in the subject. Treats on the theory, practice, construction, care, and management of Telephones and their appliances. Cr. 8vo, 349 pages, 267 illustrations. Handsomely bound, 4s. 6d. net, post free.

Sent post free at prices stated by

S. RENTELL & CO. Ltd., 36, Maiden Lane, Strand, London.

WRITE FOR CATALOGUE No. 36.

at for my opinions. However, I will take the risk by even emphasising the sentences just written.

One would like to know the truth concerning the case of the young boy who was "electrocuted" by climbing a telephone pole in a certain part of England a week or two ago. Upon the danger of such "high power" (*sic*) circuits a non-technical journal animadvert to considerable extent. Now, although the Post Office may need many more apprentice pole climbers for both telegraph and telephone work before all their lines are subterranean, and while amateur pole climbing is to be deprecated, it is scarcely advisable to advertise any further dangers of over-head construction unless such dangers have the full seal of authenticity placed upon them.

To those librarians and others who may wish to procure copies of the official work on *La technique télégraphique en France depuis l'origine*, application should be made by letter to M. Leon Eyrolles, Ecole Spécial des Travaux Publics, 3, Rue Thénard, Paris, V. The price per copy is 4 frs., with, it is understood, a considerable reduction to purchasers who mention the TELEGRAPH AND TELEPHONE JOURNAL.

As already foreshadowed the program of the Post Office Telephone and Telegraph Society of London is likely to prove more than ordinarily interesting and attractive. There is indeed not a single evening to which this description would not with ample justice apply. *Place aux dames*, however, and to Miss Heap should fall the crowded house of the season. No one will doubt that the subject of "Women's Work in the Post Office" will receive dexterous and judicious treatment at her hands, and no one will doubt but that some of the *pros* and *cons* of post-war problems will receive due attention by both speaker and audience.

It was a courageous act on the part of the committee to tackle a subject that is bound to open up whole vistas of interesting questions. It is also a tribute to the open-mindedness of many of the higher officials concerned that so thorny a question should prove so welcome an one upon the program. It is indeed quite British thus to face facts, the facts of present-day, politico-economic conditions.

With a sad but inevitable shortage of man-power to face in the near future it is well to review the national forces available on the female side. With the approaching demands for extended suffrage for both sexes, together with the increasing pressure on behalf of extended education facilities for men and women alike, the Telegraph and Telephone Services are happy indeed in agreeing to meet together to listen to so very competent an authority as is the lady "billed" to give her experiences of female labour on Jan. 22 next.

The competency of women of the type of "our chief telephonist," leads one to visualise the G.P.O. North of the future with its staff of University women sitting on committees of finance, administration and control, compiling portable Post Office guides, beautifying the present ugliness of our telegraph offices and aspiring to joint control of the secretariat itself.

Apart from these "fanciful" points of view, as some may term them, there is the very real and very difficult series of questions to be answered which will follow very quickly on the heels of the culmination of this, "Human sorrow's midnight hour." What of the position of the men who have fought and bled? Are they to be remunerated at a less figure because of the competition of female labour, and because their poor limbs have been maimed in the struggle to maintain the sanctity of British hearths and womanhood? What of the race that is to be? Where are the men, the nation's defenders of to-morrow to come from if adequate employment and remuneration be not found for every potential head of a family?

Yes, it is well that these matters should be faced, quietly, thoughtfully, competently with a single eye for the welfare—not of this, that, or the other fad, or scheme or ism—but for the well-being of the England that we love, never more loved than in these latter days when some of its best and dearest blood has been spilled to preserve her honour.

J. J. T.

LONDON TELEPHONE SERVICE NOTES.

It seems quite a short time since excitement reigned in the Trunk Exchange because the exchange was to receive a visit from the Royal Princes Henry and John. In point of fact that visit was paid before the war, yet we believe there are supervisors who still treasure tickets or docketts which have passed through the pneumatic tubes and bear the autographs of their distinguished visitors. We do not know whether it is the fact that these tickets are preserved as ensamples for those wayward record operators who write indistinctly. Now, we understand, an even greater honour has fallen to the London Telephone Service. Her Majesty the Queen, whilst being conducted by Field-Marshal Lord French around the General Headquarters, Home Forces, visited the switch-room there and the supervisor was presented to Her Majesty, who made a number of enquiries as to the girls' conditions of service and showed a marked interest in the operating. It is peculiarly gratifying to find the Queen visiting a telephone switch-



LONDON WALL EXCHANGE FLOWER STALL IN AID OF THE STAR AND GARTER FUND.

board, for the operating staff of the London Telephone Service have contributed garments in thousands to Her Majesty's Needlework Guild, and if anything were needed (which it is not) to supply an added incentive to the girls to work for the Guild this visit would have that effect.

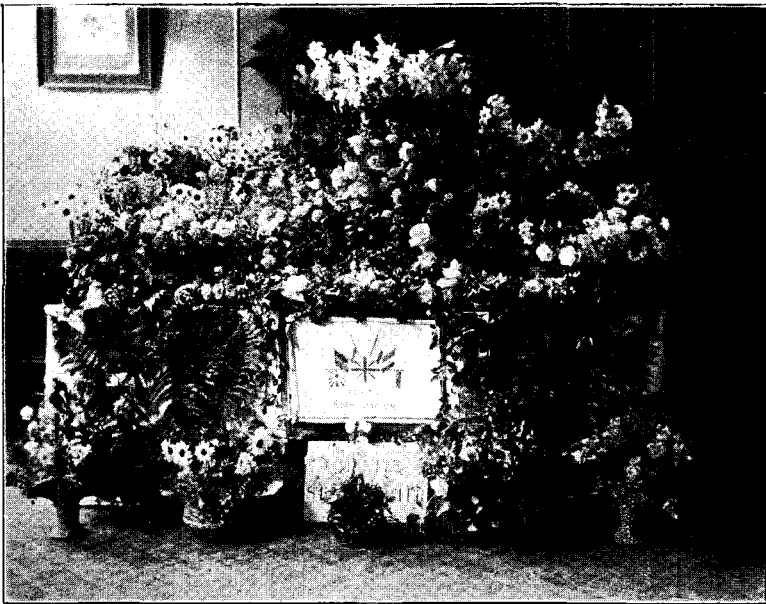
Miss Heap's fund for the "Star and Garter" Hospital is now closed. It has reached the magnificent total of £600. Miss Heap, the supervisors and telephonists may well be proud of such an achievement, particularly when one remembers the host of other ways in which the staff are contributing to war funds and other charities generally—including a collection of over £1,000 for the Hospital Saturday Fund. One cannot help feeling that the generosity displayed by the girls would justify an increase in their scale of payment, even if there were no other reason for such a course. Please, gentle reader, do not take this as an intimation that any such increase is about to mature!

We understand that Miss Heap has received a letter from the secretary of the British Women's Hospital, saying that the £600

will fully equip and build two rooms in the "Star and Garter" Hospital, and that a suitably inscribed tablet will be placed therein recording the gift of the women of the London Telephone Society.

All telephonists should at once mark in their diaries Tuesday, Oct. 10, when the London Telephonists' Society will open their session with a *conversazione* at the Memorial Hall. Membership of the society entitles one to free admission on that occasion, and it promises to be a large gathering and should prove a really enjoyable evening. The moon will be full so that even those who do not subscribe for such halfpenny papers as entitle one to free Zeppelin insurance can attend with an easy mind. There is to be plenty of talking but very few speeches, and if you would meet friends or make friends you should not fail to join the London Telephone Society (if you are one of the few who are not yet members), and then come to the meeting and make others and yourself happy at one and the same time.

If the London Telephone Society has sent some excellent "shots" to the front it can still hold its own in shooting competitions, as is evidenced by the fact that Mr. G. C. M. Willcox, of the Traffic Staff and Buildings Branch, has carried off a number of prizes at the annual meeting of the League of Post Office Rifle Clubs, and that his awards included the gold medal for the championship



LONDON WALL EXCHANGE FLOWER STALL.

of the London Postal Service. Mr. Willcox is the secretary of the St. Bride Street Refreshment Club, and possibly the necessity in these days of accounting strictly for every ounce of meat and provisions has made him see exactly where to go for Bull's-eyes.

Quite a feeling of dismay was expressed by the ladies when they looked at last month's issue of this journal, because the usual list of "resignations in view of approaching marriage" was not to be seen, and it would seem that these readers in their haste feared that the telephone girl was at a discount in the marriage market. The contrary however is the case, and were it not for the fact that such details are printed in small type there would be little room for aught else in the journal. For the prospective husbands' sake we hope it may long be so, but those who are responsible for filling the gaps must wish sometimes that the Telephone Service did not produce such an attractive type of girl.

Though we may regret the loss of these girls we have the satisfaction of knowing that they are doing equally good or better work in the homes of Britain, but what shall we say of the losses of the men who continue to be recorded. During the last few weeks we have heard of the loss of Mr. Silver, of the Installation

section; of Mr. Wylie, of another section of the Accounts branch; and of Mr. Buxton, an Assistant Exchange Manager attached to one of the exchanges in the G.P.O. South. Of these three the first only was personally known to the writer of these Notes, and a more hardworking, unassuming fellow could not have been met. All who worked with him will sadly miss him. He did not join one of the regiments peculiarly associated with Civil Service men, but went to the "London Irish," a regiment which has added to its fame during this war and we may be sure that *our* representative in the corps played his part well.

THE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

The programme for the 1916-17 session has been restricted to six evenings. The papers to be given are as follows:—

- | | | |
|----------------|-----|---|
| Oct. 23, 1916 | ... | Introductory Address by the Chairman, Mr. A. B. Walkley, followed by an Address by Mr. H. W. Pendry on "Traffic and Practical Notes on Machine Telegraphy." |
| Nov. 20, 1916 | ... | Sir William Slingo on "Technical Training in the Post Office." |
| Jan. 22, 1917 | ... | Miss Heap on "Women's Work in the Post Office." |
| Feb. 19, 1917 | ... | Miss Tynan (C.T.O.) on "Some Phases of the Inter-communication Switch." |
| | | Miss Baldwin (L.T.S.) on "Trunk Loads." |
| Mar. 12, 1917 | ... | Mr. Powell (Western Union)—title not yet fixed. |
| April 16, 1917 | ... | Mr. M. C. Pink (L.T.S.) on "Subsidiary Telephone Services." |

The Postmaster-General has promised, subject to his political engagements, to attend at one of the meetings.

A TELEPHONE ADVANTAGE.

"We have put in a telephone," chirped Vanessa.

"Great convenience," said Maud.

"Yes; and just look at this book that came along with it. What a variety of numbers they place at your disposal!"—*Louisville Courier-Journal*.

LAMENTED COURTESY.

"I once knew an eccentric man," said old Festus Pester, "who when he had got the desired number on the telephone did not demand fiercely, 'Whizz ziss?' Instead, he invariably said civilly, 'This is John J. Poppendick, wishing to speak to Mr. Buckover.' His funeral was the largest ever held in the neighbourhood where he had resided, and thereat strong men broke down and wept like children, being convinced that they would never again see his like."—*Telephone Talk*.



[Reproduced by the special permission of the Proprietors of "Punch."]

CYRIL (whose father has just had the telephone installed): "—and bless father and mother, and make me a good boy—and keep away all Zeppelins (pause) Watkins junior is speaking."

MR. H. BILLE.

WE deeply regret to announce that Mr. Harald Bille met with a fatal accident whilst travelling from Norwood Junction to Victoria Station on the evening of Aug. 19. His loss will be felt not only by the company (Creed, Bille & Company, Limited), of which he was joint Managing Director, but by the whole telegraph world. He was the inventor of the Bille perforating receiver and other telegraph apparatus, and occupied a position in the front rank of telegraph engineers. He was a Graduate in Engineering of Copenhagen University and a member of the Institute of Electrical Engineers. He was for many years in the employ of the Great Northern Telegraph Company, but four years ago joined Mr. Creed in the formation of Creed, Bille & Company, Limited, and the development of that company to its present importance was due in no small part to his energy and ability.



MR. H. BILLE.

Since the commencement of the war he had devoted himself with an unflagging energy to the work of producing munitions.

A Danish subject, he was heart and soul with the Allies, and had recently applied for letters of naturalisation, so that he might offer his services to the War Office in any capacity he might be considered useful. A life of great achievement and of still greater promise has been brought to an abrupt end at the early age of 37. He leaves a wife and three children and a host of friends to mourn his loss.

A considerable number of Post Office Telegraph men knew Mr. Bille intimately. He had conferred with them as regards the working of Creed instruments, and they had uniformly the highest regard for his width of knowledge and his considerateness of mind and his gentleness of bearing. They would wish to be associated in expressing their deepest sympathy with the firm of which Mr. Bille was a member, and with his family.

BELFAST G.P.O. HONOUR ROLL.

An illuminated Roll of Honour to those men of the Belfast Post Office District who answered their country's call was formally unveiled last month at the Belfast Post Office, the ceremony being performed by Mr. Arthur H. Norway, Secretary to the Post Office in Ireland, before an enthusiastic gathering of the staff. There are 352 names inscribed, and of these 21 have rendered the supreme sacrifice in the nation's cause.

The Belfast Postmaster, Mr. S. G. Forsythe, presided, and warmly welcomed Mr. Norway to Belfast. He said the ceremony of that evening was one of special interest to all present. The names on the Roll represented 33 per cent. of the local staff, but if they eliminated those men who were debared from serving on account of age or physical unfitness, the percentage rose to 50. That was, he thought, a record of which to be proud.

Mr. Norway said they certainly should feel very proud of the splendid record of their district, and it was a happy thought that prompted a permanent memorial to those men who had gone from their midst when the great call sounded. There were, of course, many men who had answered as reservists, but the majority were men who had not chosen arms as a profession, but who nevertheless were ready and willing to leave the comforts of civil life behind and go forth under the nation's flag to give battle to a common enemy. These were men who should be honoured, and whose names should never be permitted to fade from memory. They were "men who had not failed the King," and their colleagues at home should feel proud of them.

A hearty vote of thanks to Mr. Norway for his kindness in attending for the ceremony was afterwards passed on the motion of Mr. Archer Smith (District Manager of telephones), seconded by Dr. Walton Browne, and supported by a number of officials representing the staff. The singing of the National Anthem brought the proceedings to a close.

RETIREMENT OF MR. EDWARD BEAUMONT.

Mr. Edward Beaumont, Assistant District Manager, Harrogate, on retiring on June 14 was presented by the District Manager (Mr. John H. Storrie) on behalf of the staff of the York district office with a case of tobacco pipes and a suede tobacco pouch. He also received a handsome smoker's cabinet from the Harrogate Operating, Engineering and Postal staffs.

Mr. Beaumont has been in the Telephone Service for the long period of 34 years, and during the 25 years he has been stationed at Harrogate the exchange has grown under his care from 29 lines to over 1,200, representing 34.4 subscribers per 1,000 inhabitants, which, it is claimed, is the highest average of any town in Great Britain where tariff B rates only are in operation. One of the earliest engineering works with which Mr. Beaumont was intimately connected was the running of the Harrogate portion of the main trunk lines in 1892 which were the first trunk lines to couple the North with the South. In leaving the Service Mr. Beaumont retains the warm regard of many friends and he carries with him their earnest wishes for a long period of happy retirement.

PERSONALIA.**NEWS OF THE STAFF.****LONDON TRAFFIC STAFF.****Transfers—**

Miss L. BEARDWELL, Assistant Supervisor, Class II, has been transferred from Croydon to Victoria Exchange.

Miss EDITH HUTCHINS, Assistant Supervisor, Class II, of East Exchange, has been transferred to Woolwich Arsenal.

Miss B. M. BROTHERWOOD, Assistant Supervisor, Class II, has been transferred from Avenue to Regent Exchange.

Miss A. M. WHITE, Assistant Supervisor, Class II, has been transferred from City Exchange to Woolwich Arsenal.

Miss RICHMOND, of the Lee Green Exchange, has been transferred to the Woolwich Arsenal, and was presented with a flower epergne and a picture.

Miss JESSUP, of the Lee Green Exchange, has also been transferred to Woolwich Arsenal and was presented by the staff with a gold brooch.

Miss D. M. WALKER has been transferred from Avenue to Willesden Exchange.

Miss E. HARRINGTON has been transferred from Avenue to the Trunk Exchange.

Miss E. VINSON has been transferred from Avenue to Wanstead Exchange.

Miss E. CREED has been transferred from Avenue to New Cross Exchange.

Miss M. P. BALLS has been transferred from Park to Victoria Exchange.

Miss R. M. PARROTT, a Telephonist at Park Exchange, has been transferred to Victoria.

Resignations—

Miss GLADYS M. AUGOOD, of Hampstead Exchange, has resigned and was presented with a gold bracelet by her colleagues.

Miss E. L. P. WALKER, of Croydon Exchange, has resigned on account of her approaching marriage.

Miss F. LUCAS, of the Tottenham Exchange, has resigned.

Miss FLORENCE M. WELLS, of East Exchange, has resigned.

Miss S. COLLINS, of North Exchange, has resigned.

Miss F. GOOD, of London Wall Exchange, has resigned.

Miss J. WHITE, of London Wall Exchange, has resigned.

Miss P. MEKLE, of London Wall Exchange, has resigned.

Miss E. R. WHISKIN, of London Wall Exchange, has resigned.

Miss A. FLETCHER, of London Wall Exchange, has resigned in view of her approaching marriage.

Miss E. MARCHANT, of Avenue Exchange, has resigned.

Miss N. YOUNG, of Avenue Exchange, has resigned.

Miss R. COLLIER, of Avenue Exchange, has resigned.

Miss S. SCOTT, of Avenue Exchange, has resigned.

Miss M. HILL, of Avenue Exchange, has resigned.

Miss G. BLACKMAN, of Avenue Exchange, has resigned.

Miss M. E. GUMMERSON, of Park Exchange, has resigned.

Miss F. E. E. MOORES, of Kensington Exchange, has resigned in view of her approaching marriage and was presented by her colleagues with a set of fish-knives and forks and other gifts.

Miss F. CONWAY, of City Exchange, has resigned on account of her approaching marriage.

Miss L. A. LINES, of Hammersmith Exchange, has resigned to be married and was presented with a silver cake basket by the staff and numerous other gifts by individual members.

Miss R. M. POWELL, of Hornsey Exchange, has resigned.

Miss MAY MORRIS, of the Trunk Exchange, has resigned on account of her approaching marriage and was presented with a silver tea service.

Miss CLARA A. LEVERETT, of the Trunk Exchange, has resigned and was presented with a silver tea service.

Miss MABEL COLLINS, of the Trunk Exchange, has resigned in view of her approaching marriage and was presented with a silver tea service.

Miss WINIFRED WILSON, of the Trunk Exchange, has resigned to be married and was presented with a dinner service.

Miss GRACE DOWNTON, of the Trunk Exchange, has resigned.

Miss K. ROBINS, of the Willesden Exchange, has resigned to be married and was presented with several useful gifts by the staff, including a silver cake basket.

Miss R. ALDRIDGE, of Brixton Exchange, has resigned on account of her approaching marriage.

Miss A. E. MORTON, of Brixton Exchange, has resigned.

Miss E. M. BURNAGE, of Woolwich Exchange, has resigned.

Miss FLETCHER, of Woolwich Exchange, has resigned.

Miss M. L. MCGLEGOR, of Paddington Exchange, was presented by the staff with a tea service on resigning.

Miss E. M. JACOB, of the Hop Exchange, has resigned on account of her approaching marriage and was presented by her colleagues with a tea service.

Miss J. M. HUGHES, of the Hop Exchange, has resigned.

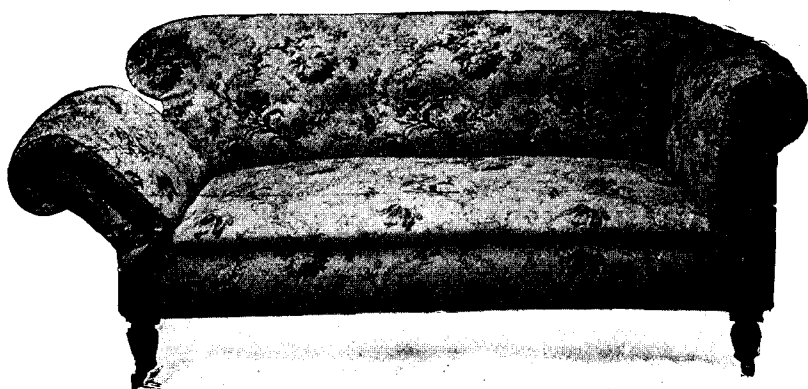
Miss E. M. TOMKINS, of the Hop Exchange, has resigned.

Miss W. M. ATKINS, of the Hop Exchange, has resigned.

Miss EDITH J. TURGIS, of Holborn Exchange, has resigned.

Miss MURIEL M. QUICK, of Holborn Exchange, has resigned.

Miss URSULA H. HELYER, of Holborn Exchange, has resigned.



For
**Comfortable
Furniture**

of Sound Construction
and Tasteful Design
at Moderate Prices

WE ARE UNEXCELLED.

CHESTERFIELD SETTEE.

5 ft. 6 ins. wide.

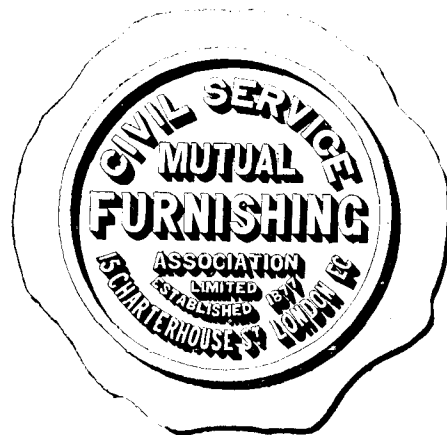
Both ends to drop.

Stuffed all hair. Upholstered in best quality Cretonne,

ONLY

£6:17:6

Carriage paid to any Goods Station in
United Kingdom.



**CIVIL SERVICE
Share Purchase and Investment Society, Ltd.**

ESTABLISHED 1885.

Registered under the Industrial and Provident Societies' Act, 1876.

143, QUEEN VICTORIA STREET, LONDON, E.C.

This Society offers facilities for purchasing or mortgaging Shares in the Civil Service Supply Association and other Stocks, Shares and Securities, by means of Advances repayable by monthly instalments at the following rates for each £10 advanced.

ADVANCES MADE ON LIFE POLICIES.

Monthly Rate of Repayment (Principal & Interest Included) for each £10 advanced.

1 Year. 2 Years. 3 Years. 5 Years. 7 Years. 10 Years.
17s. 5d. 9s. 1d 6s. 3d. 4s. 1d. 3s. 1d. 2s. 5d.

Stocks and Shares bought or sold through the agency of this Society.
Full particulars may be obtained of the SECRETARY.

The amount advanced since the commencement of the Society exceeds the sum of £600,000.

When your Safety Razor pulls

Don't throw away the old blades; pack them up and send them to us, and we will re-grind and re-set them and return them to you post free, and charge you only **ONE SHILLING** per doz. blades.

EMPIRE RAZORALITIES

(Dept. T.J.)

16 LIVERPOOL STREET ARCADE, LONDON, E.C.

**OPEN AN
ACCOUNT AT CRICHTONS'**

for your present-day needs.

Write for a copy of the new **MODE BOOK** just out, and particulars of the strictly private confidential "Times" system which enables you to purchase your immediate needs, and pay a small sum monthly which you will never miss.

**Let Crichtons' supply
all your present needs.**

**Coats & Skirts,
Dainty Frocks,
Blouses, Silk
Sports Coats,
a useful Rain-
coat or Mac,
Underwear &
Slumber-wear,
Shoes, Trunk,
Case or Bag,
etc., etc.**

Thousands of
satisfied customers
testify to the advan-
tage of the "Times"
System. Send a
Postcard now, and
full details will be
sent immediately.

SPECIAL TERMS
to Telephone and
Post Office Staff.

CRICHTONS' L^d

Ladies' Tailors,
Furriers and Outfitters,

14, CRICHTON HOUSE, DEVONSHIRE SQUARE, LONDON, E.C.
(One minute from Liverpool Street Station)



WHERE TO STAY.

The attention of our Readers is directed to the following list of Boarding and Apartment Houses.

BARMOUTH.—West-End Boarding Establishment. On sea front. Excellent catering. Highly recommended. Restful, comfortable and pleasant. Moderate tariff.—Winchester.

BARMOUTH (the Beautiful "Glencairn").—The most comfortable Private Hotel and Boarding Establishment in North Wales. Charming situation overlooking bay and mountains. Spacious well-furnished lounge. Excellent and liberal cuisine. Moderate inclusive tariff.

BARMOUTH, N. WALES.—Centrally situated. Commanding beautiful view of Cardigan Bay and surrounding hills.—Mrs. Jones, Bodann, Harbour View.

BUCKS.—Lovely situation. Bedroom and sitting-room, coals, light, attendance, 18s. 6d. Two ladies or lady and gentleman.—Mrs. Carter, Misbourne Gardens, Chalfont St. Giles.

CLIFTONVILLE, MARGATE.—"Rosenburgh" Boarding House. 110 bedrooms. Situated best part of town. One minute to sands and concert parties. Four minutes to tennis and bowls. Social evenings and dancing in large recreation room. Hot luncheon, late dinner, excellent cuisine. Special terms to those quoting "T. & T. Journal." Phone 233.

DEAN FORREST, Severn-Wye Valleys.—Beautiful Holiday Home (600 feet up). Spacious house, grounds, bath, billiards, tennis, croquet, motors, magnificent scenery. Vegetarians accommodated. 35s. to 42s. week.—Photos, prospectus, Hallam, Littledean House, Littledean, Glos.

S. DEVON, TORQUAY.—Furnished Apartments with or without board. Moderate terms. Good recommendation for cyclists. Near sea, downs, golf links, park, church and country walks.—Mrs. H. Bailey, 149, Babbacombe Road, Babbacombe.

EASTBOURNE.—"Polytechnic" Boarding House. Recommended by "Polytechnic," Regent St., since 1894. A comfortable holiday home. Liberal table. Terms from 25s. w'kly.—Mrs. Edwards, 109-111, Tideswell Rd.

EASTBOURNE.—Kuvee Boarding Establishment, 55, Jevington Gardens. Sunny position, overlooking sea. Near Wish Tower. Comfortable, moderate.—Mr. and Mrs. Wagstaff.

EDINBURGH.—The Cockburn Hotel, first class Temperance, adjoining Waverley Station.

EDINBURGH.—Board for Visitors, day or week.—Misses Carter, 6, Howe Street.

HASTINGS.—Superior Apartments. Bath, h. & c. Every home comfort. Near sea, station and trams. Delightful situation, overlooking Alexandra Park.—Miss Blackwell, Springfield, 38, Lower Park Road.

ILKLEY.—"Wharfedale Mount." Apartments or Board. Good position. Homely and comfortable. Lovely views. Baths, &c. Terms moderate and inclusive.—M. A. Ward.

JERSEY.—**STAR HOTEL.** Facing the harbour. Very moderate inclusive terms. Illustrated booklet, with full tariff and some interesting information, post free. Passport necessary.—A. Raynor Smith, Propr.

LONDON, HYDE PARK.—4 minutes' walk therefrom and 7 from Kensington Gardens. Absolutely ideal situation for amusements—business—shopping. Comfortably furnished bedrooms from 7s. 6d. to 21s. weekly. Breakfasts if desired 9d. Best provisions only, no margarine. Penny bus to Oxford Circus. No gratuities, no extras.—Apply, 32, Southwick Street, Cambridge Terrace, Hyde Park, London, W.

SWANAGE.—The Highcliffe Private Hotel and Pension. Unrivalled position on sea-front. Near Golf Links. Excellent cuisine. Inclusive terms. Enlarged 1911 & 1912.—Telephone: 47 Swanage. Mrs. Hooke, Proprietress.

TORQUAY.—Apartments conveniently situated in best part of town. Near trams. Commanding fine view of bay. Ten minutes from sea. Cool position for summer. Moderate terms.—Fitzherbert, 5, Lisburne Crescent.

WENSLEYDALE.—The Heugh, Aysgarth, S.O. About 1,400 ft. above sea level, facing S.W. Magnificent views. Waterfalls and ruins in neighbourhood. Recommended by officials. Particulars from Miss Smith.

WESTON-SUPER-MARE.—The Lynn Boarding House, 22, Salisbury Terrace. Best position on sea front (facing Grand Pier). Convenient for all amusements. Every comfort. Liberal table. Week-ends from 10s. 6d. Highly recommended. Billiards.—Mrs. N. Evans, Proprietress.

"VISITORS TO LONDON."

TRANTER'S TEMPERANCE HOTEL,

6, 7, 8 & 9, Bridgewater Square, Barbican, E.C.

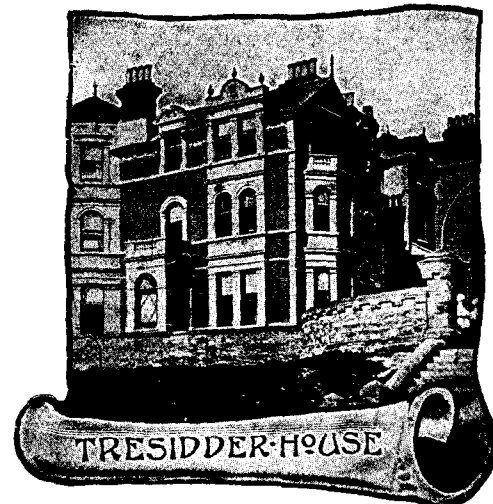
MOST CENTRAL FOR BUSINESS OR PLEASURE.

2 minutes' walk from Aldersgate Street Railway Station; 7 minutes' walk from St. Paul's Cathedral and G.P.O. Very convenient for Shopping Centres, Amusements, and all Places of Interest. Terms: Bedroom, Breakfast, and Attendance, from 4s. Other meals optional. Tea, from 1s. to 1s. 9d. Electric Light. Night Porter. Established 1859. Telegrams: "Healthiest, London." Phone: Central 959. Write for "How to Spend a Week in London," with Tariff and Testimonials Free. Quiet, Home-like, and Comfortable. This Old-established Hotel is again under the Management of

G. T. S. TRANTER, Proprietor.

HASTINGS

AN AUTUMN RESORT.



HOLIDAY HOME for LADIES

For Particulars and Terms apply to the Hon. Sec.:

Mr. THOS. HUME,

The Sunday School Union,

56, Old Bailey, London, E.C.